A World-Wide Shortage of Chemical Pulp

THERE is a world-wide shortage of chemical pulp, the like of which has never been known before in the history of the paper industry.

The only reason that prices on pulp and paper products have not staged dramatic price advances at this date is because the facts and figures on chemical pulp supplies have not yet been properly appreciated and appraised.

The facts are public propery. They have all been collated and published, and the strange thing is that all of this necessary data reposes today in the great majority of paper-producing managers' offices, but they have not been studied.

In February, 1936, the United States Pulp Producers Association at 122 Forty-Second Street, New-York City, issued and supplied to each of its large pulp-producing membership "World Wood Pulp Statistics," from 1925 to 1935 inclusive, upon all domestic production, foreign production, imports, capacities, consumption, etc. for all divisions of pulp. This compilation of facts and statistics reveals an amazing situation and one which will become exceedingly acute in the year 1937.

Every pulp-producing or paper-making unit in the country should have a copy of these invaluable statistics showing the tables and setting out in exact detail all of the facts regarding the sources of supplies of pulps. They should be studied, mastered and acted upon without delay.

The fact is that it may be too late for the mills and other consumers of chemical pulps to cover their supplies for 1937, particularly in the bleached sulphite and unbleached sulphate divisions.

A recent survey of the sources of supply for 1937 chemical pulps shows that every available ton, made either in the United States or in foreign countries, is known, marked and specified for 1937 delivery.

"But," some interested consumer asks, "what about the new mills in the South? Won't they relieve the shortage?"

The answer is—"not to any appreciable extent."

Here is the Southern United States situation to date on new mills:

A total of 155,000 tons is certain to be on the market. But, as with the case of the Charleston, South Carolina mill, scheduled to make all liner board totaling 50,000 tons per year; the mill will not ship over 25,000 tons during 1937. The Crossett mill in Arkansas, is not scheduled to make products for the market until next February. The other two units are kraft bag paper units, one of which will deliver 40,000 tons and the other, less than 20,000 tons of kraft bag paper.

Bear in mind, at the same time, that the increase in shipments of kraft bag paper exceeded 85,000 tons for 1936, and the new production still leaves a net shortage of 25,000 tons under the 1936 increased demand. In other words, the new production of kraft

bag paper available for 1937 is only about 66-2/3 per cent of the increased demand in 1936 over 1935.

In the unbleached sulphate division alone, the increased demand for kraft paper in 1936 over 1935 will be in excess of 140,000 tons. The increased production coming onto the market from the South on kraft board, bag paper and paper in 1937 will not amount to 140,000 tons—and, in addition, all authorities predict a further 10 per cent increased demand for kraft paper production in 1937.

Where is the pulp coming from to make the paper to fill that increased demand?

It is not extant in the world today.

Hazards and Dividends

SOME years ago a world famous technical man in a field not far removed from the pulp and paper industry commented in a lecture to a group of technical men in the same field as himself that never had he invested money in the industry with which he was associated. Such a statement may be a little too bold; as upon analysis it would not be entirely true.

He had spent money to receive his technical training in order that he might serve his profession. He had traveled widely in the interest of his work. He was a keen student and no doubt had invested a tidy sum in technical books and other literature to serve him as councilors whenever occasion demanded. All in all, he had made a big personal investment in the field that gave him his livelihood.

What he really meant to infer was that he had never invested any money in the physical attributes that constituted the industry.

In trying to justify this behavior, he said that the only reason to account for his action that he could give was that he appreciated the hazards too well.

He enjoyed his work. He thrilled at the progress and accomplishment that had come to the industry during his years of association with it. He had vision of future possibilities that were tangible further advancements. Yet, never had he the courage to put any of his money back into the industry in a material way.

The existence of the hazards which he feared is not to be questioned. Yet, with his knowledge of the industry, it seems that the good could have been separated from the chaff and money invested accordingly.

Most certainly that great industry had proved a gold mine for some, and a quagmire for others.

Cannot a comparable situation be found in the pulp and paper industry?

The industry, to be sure, has its financial hazards, but what industry hasn't? Some firms have always been money makers; others have not. Likewise, there are some individuals within the industry, like the one cited, who have found the industry to their liking, have given their very lives to it, and who are in position to invest in its capital structure but who do not because of the fear of financial loss.

With all of the expansion that is now under way within the industry, wouldn't it be a good idea for such individuals to look into the possibilities of investment within it and to convert the hazards which they now have into dividends?

Christmas Peace

OF all the words used by the human family to express its hopes, ambitions, desires and exultations, none have the magic power of "Merry Christmas." This cheery salutation effaces worry, it blots out the memory of wrongs; it lifts the soul of man to a promised land of well being, and leaves within him a sense of peace that rests like a benediction throughout the holiday season.

This Christmas, the thought of peace should be very precious to all who dwell in this wonderful country of ours. In other lands the roaring image of war will stalk its fearsome way. Instead of the peaceful joy and good tidings of Christmas, there will be suffering, loss of life and fear of impending combat, all too horrible to contemplate.

And on the eve of the holiday season, the President of the United States has just returned from a peace voyage to a neighboring country. There he pled with the score of republics represented to work and pray for the preservation of peace that the people of these nations may be spared the cruel ravages of future wars.

The thought of peace must grow and blossom in the hearts of the people. Man must love his fellow men; he must give up the quest for possessions, for power, for dominance; he must learn the spirit of true brotherhood if universal peace is to reign. Only by following this principle can we really know and experience the full meaning of those good tidings, "Peace on earth, good will toward men."

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LINK-BELT POSITIVE DRIVES INCLUDE

What We Really Sell

WILLIAM SIBLEY

SO you thought we were papermakers! Well, well, it does beat all how these ideas get around! Just because our mill is bursting with wood, pulp and chemicals; and just because we went to the expense of installing huge, block-long machines which take the pulp and carefully fashion it into the thinnest sort of sheets; and just because we have mentioned it from time to time you hastily jumped to the conclusion that our business was making and selling paper.

Well, you are dead wrong—you stand in need of correction. Far be it from us to scorn the making of paper, or the selling of that essential. Both are very worthy enterprises, laudable and well respected. But my dear sir, to have you think that we do nothing but make and sell paper—really, I'm surprised.

What we really make and sell is something quite different than you think. We make and sell the most precious, the most fragile, the most needed, the most beautiful things in all the world. We sell the transmission of thought. We sell ideas. We sell love. We sell romance. We sell adventure. We sell loyalty that both lasts and grows through the years, uncontaminated by time or tide. We sell truth, perserverance, achievement and success. We are purveyors of protection; disseminators of sunshine. We sell the means to the end. The thing we sell admits of money making, of money saving and of money spending. We sell limitless beauty; the facsimilies of gorgeous sunsets; reproductions of lovely gardens. We traffic in health, happiness and warmth; we deal in illumination, understanding and right thinking.

And you thought we merely made and sold paper! Only to the extent that we make it possible to have two cigarettes in the dark, or that we are the promoters of kisses. We are not so much the agents of paper as we are the agents of rapture, the representatives of ecstasy, the ambassadors of tenderness. We sell the thing that becomes the guardian of memories; the builder of dreams; the fulfillment of hope. We sell music, melody and tone. We traffic in harmony. What we sell revives inspiration, excites passion, stimulates action. We are purveyors of progress.

While we unselfishly promote all forms of art, we chiefly aid the literary art. And literature, of all the arts, is the most real, the least dependent upon interpretation. No one discounts the artistic abilities of the great masters, be they Bach, Beethoven, Handel, Rembrandt, Holbein, Whistler, Bernhardt, Booth or Barrymore. As we say, we believe ourselves to be of help to all of them. But the emphasis of our aid is laid upon literature. To play some instrument or to listen to music, to paint pictures, or to study them, to enact a drama or to see a play requires nothing but personal interpretation. And we gain pleasure from those arts in direct proportion to the quality of our own individual interpretation. But in literature, that form of art we help most, everything is literal, real, true. Once recorded on the thing we sell, the thought never changes. Go to the library and you may find the thoughts of Hugo, Einstein or Plato exactly as they were thought—at the time those men thought them. And so we say — *WE SELL TRUTH.*

THE PAPER INDUSTRY
A MONTHLY EDUCATIONAL JOURNAL

How a Southern Mill Built a Safety Program

ARCH H. BEATON*

"CLEANLINESS and safety go hand in hand and where you find these you will also find efficient operation." That statement was made by the plant manager of the Harriman Company, Harriman, Tennessee, when the plant first began operations in 1929.

On June 30, 1936, this same Harriman mill led its group in the safety contest conducted by the National Safety Council, establishing the perfect record of operating a full year without a single lost-time accident. The establishment of this fine record in safety was the result of an intelligent and continued program of accident prevention following the basic principles laid down in 1929.

Harriman is a charming southern town set in a picturesque spot amid the foothills of the Cumberland mountains whose rugged peaks, like watchful sentinels, stand guard over it. Tumbling down from the mountains the Emory River makes an almost complete circuit of the town and, five miles distant, empties into the Clinch River, now harnessed by the famous Norris Dam some fifty miles north of Harriman.

The Harriman Company's mill is located on the Emory at the eastern extremity of the town. Directly back of the plant towers a sheer cliff known locally as Lover's Leap, a limestone bluff rising some three hundred feet in height. Viewed from the top of this cliff the plant presents a striking picture of industrial beauty. The neat, orderly buildings, clean mill yards, well mantained tracks, the woodyard with its rows of neatly stacked wood, and the office building with its fresh green lawns, shady trees, and tennis courts make a picture to delight the eye.

(*) The author is now connected with Jno. H. Heald Company, Lynchburg, Va., but until recently was with the Harriman Company. It was while there that the material for this article was gathered.

Early History

An abundance of chestnut wood in East and Central Tennessee, its ideal railway facilities and its location near the famous Appalachian coal fields made the region around Harriman desirable, many years ago, as a center for the manufacture of Chestnut Tanning Extract. During the early 80's of the last century, several extract plants were in operation in various East Tennessee cities and for many years Chestnut Tanning Extract was shipped to the tanneries and leather factories in all corners of the United States, Canada, and Europe. It was not until 1924, however, that the possibilities of manufacturing paper from the vast supply of spent chips was realized. In that year, chemists of the Mead Corporation began experimentation with the end in view of making paper from chestnut. Their quest was successful and as a result several board mills were erected in the state, the most recent being the Harriman plant which was completed in 1929.

Manufacturing Processes

Operations at the Harriman mill entail two separate and distinct processes, (1) the extraction of tannic acid from chestnut wood and (2) the manufacture of nine-point corrugating board. Two hog chippers, driven by 150 hp. motors grind some seventy-five cords of wood daily. The resulting chips are shredded to increase their permeability and leached, a process in which the chips are soaked in large cypress tubs filled with hot water. This process dissolves and extracts the tannins from the wood. The resulting liquor is drained off and pumped to evaporators where, by heat and vacuum, it is reduced to a sirupy consistency for tank

car shipment to the tanneries, or further dried in rotary dryers to a fine powder for bag shipment.

The spent chips, from which the tannic acid has been extracted, are sent by conveyors to the pulping plant where they are stored in chip bins until ready for use. Here they are dumped into rotary digesters to undergo a partial cooking process under steam pressure and high temperature. After cooking, the chips are fed through refining mills for reduction into pulp. The output of this semi-chemical pulp from the pulping plant averages seventy-three tons daily. The pulp then goes through the usual refining processes found in the average paper mill such as beating, jordaning, etc., and is manufactured into the finished board on a 138-inch-trim Black-Clawson cylinder machine.

Below—
The modern office building is surrounded by beautifully landscaped grounds

Above—
One view of the wood yard

Left—
Main buildings of the Harriman plant

Steam and electric power required in production is produced in a modern power plant from coal obtained a few miles distant. The two and a half million gallons of water daily required for plant operations is pumped from the Emory River in a manner unique in itself from an engineering standpoint. Because of its rapid flow and the wide mountain area which it drains, the Emory River rises very rapidly during heavy rains. In 1929, this stream rose sixty-three feet above normal level in a single night, sweeping away a considerable portion of the town and some thirty of its inhabitants.

Unique Pumping System

On account of the elevation from the river bank to the normal surface of the river (some 40 feet), it was not possible to install a pumping system on higher ground and yet the risk of floods was too great to consider placing the pumps down near the water level in the conventional manner. The pumps, motors, etc., were installed in a large water tight turret at the normal level of the river. Connecting with this turret, a large metal tube was built, running some seventy feet to the top of the river bank where it enters another water-tight chamber fitted with water-tight doors. During times of high water, the pump, motor and even the lower turret may be completely submerged in many feet of rushing water but all remains well with the pumping system.

Many Potential Hazards

In the numerous operations necessary for the manufacture of the finished roll of paper or the bag of tanning extract, hazards are to be expected daily. The loading and stacking of wood, reducing the wood in high speed chippers, operating the leaching process where men work around huge vats of scalding water, the many operations involved in the manufacture of

pulp and paper, the loading and shipping of rolls weighing from one-half to two and a half tons each, and the maintenance of the mechanical equipment all are fraught with the potential accident which may lie hidden in the operation. To anticipate these hazards and to eliminate them before an accident occurs is the job, not of the safety man alone, but of the entire working force. It has been the constant aim of the management since the first day of operation to drive this responsibility home to every employee.

Management Sustains Safety Program

This is achieved through the active backing of the management of a sustained safety program, the object of which is to educate foremen and employees alike in the principles of safe working. As cleanliness and safety go hand in hand, the maintenance of good housekeeping is a point continually stressed. Foremen and supervisors are impressed with the fact that good leadership and example are attributes of prime importance in handling men. Employees are encouraged to keep departments clean and neat. Arrangements are made for the proper disposal of waste and dirt. Suitable covered metal containers are provided in all departments to take care of greasy rags, waste, or other inflammable material. Employees are encouraged to use their spare time in tidying up and improving the appearance of their working places and brooms, wiping rags and paint are supplied for this purpose. A spirit of friendly rivalry between departments is fostered and employees take an active interest in endeavoring to maintain high grades with the inspection committee which makes a weekly tour of the plant. This committee inspects each department thoroughly, grades it accordingly and receives suggestions from the employees for the improvement of conditions.

The plant is well equipped with toilet facilities, showers, lockers and electrically-cooled drinking fountains which are kept spotlessly clean. The company maintains a very complete fire fighting equipment and a standard first-aid department for treatment of minor injuries and the recording of same.

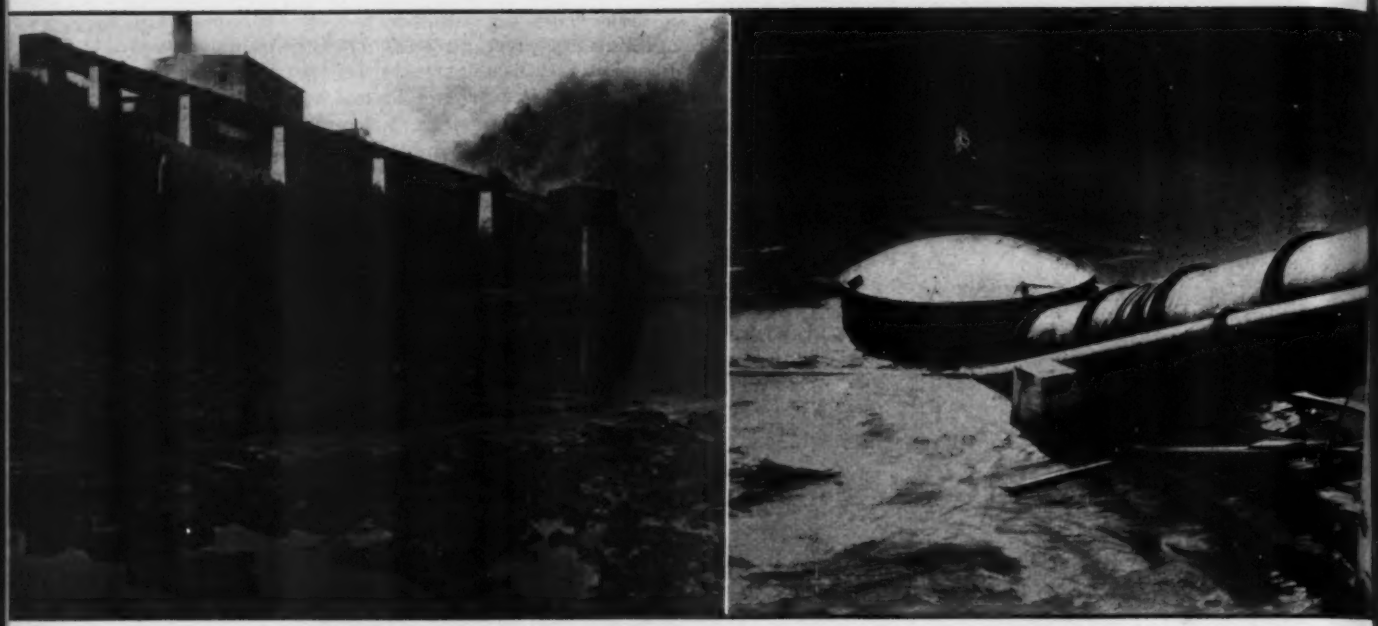
Outside appearances are in keeping with the interior. The yards, lawns, and tracks are well maintained and dirt or scrap is not allowed to accumulate. The wood yards are in keeping with the rest of the plant in appearance. Wood is piled neatly, not alone for the sake of appearance but to prevent the possibility of tumbling and causing an accident. This practice of storing wood neatly is no more difficult than a slip-shod method of stacking and pays dividends in the form of easy inventory, fire protection, and safety.

Interest in recreation and athletics is encouraged by the management and periodic outings and picnics are held in which all employees participate. For those interested in tennis, excellent facilities are provided in the form of first class courts located near the main office building. The plant baseball team—one of the best in the South, has its own park, a model in attractiveness, and the team has the active support of all of the employees. Under such conditions relations between men and management are most cordial. Thus the interest shown in safety by the management is shared by the supervisory staff and, in turn, governs the attitude of the rank and file employee.

Accidents Are Cost Factors

That accidents are a factor, both in the direct and indirect cost of operating a paper mill, is an item that is becoming increasingly apparent to the operating heads of the industry. There was a time when an accident, like a stroke of lightning, was considered an act of God and nothing could be done to prevent it. Once, the papermaker, like the prize fighter, was not considered an expert in his trade unless he bore the earmarks of his profession. A couple of missing fingers, mute evidence of carelessness around the cal-

Left—Turbine room. Right—Paper machine from dry end. Note clean condition of floors, walls and equipment in both views



Two views of unique pumping system for mill water supply. Left—Stream at low level. Right—Stream at flood level

ender stacks, once denoted a master in the ancient art.

During the past twenty-five years the attitude toward accidents has undergone a radical change. It was learned that accidents are preventable and with this knowledge came the realization that, from the standpoint of costs alone, accidents were a factor worthy of grave consideration. A low accident rate is indicative of careful supervision and careful workmanship which feature is reflected, not only in low accident costs, but in the efficient operation of the plant in general. Conversely, it has been proven that high accident rates are usually to be found in the untidy plant where inefficiency, carelessness and slipshod workmanship are the order of the day.

Besides the actual costs of compensation and medical treatment, there are numerous other items of expense attendant upon accidental injury which are not always taken into consideration. The cost of selecting and training new employees to replace the injured man, the cost of time lost by the injured man, his fellow workmen, and of the supervisors and other executives, are items of considerable importance. The damage to tools, machinery or materials, the slowing up of production occasioned by nervousness of employees, particularly if the accident occurs on a machine requiring rapid manual operation, the added risk to men and machinery in breaking in new help, the cost of investigating accidents, preparing state reports, attending hearings, etc., all enter into the costs of accidents. It has been found that these costs are equal to four times the amount of compensation, insurance, and medical costs.

The cost of accidents in the plant with an average of two hundred employees will run from $2000 to $3000 per annum in actual compensation costs, insurance, and medical treatment alone, if the accident rate is high, with a frequency of, say, 35. The total costs will run well into $10,000 per year. Compare these figures with those of the plant where accidents are rare and where the total annual cost of accidents will not exceed eight or nine hundred dollars and the variance is startling. The figures are sufficiently convincing to warrant the establishment of a sound safety program in any manufacturing plant, and the dividends are actual cash.

Employee Representation Plan

Safety work at the Harriman mill is in charge of P. C. Ellis, pulp mill superintendent. Mr. Ellis is chairman of the Mill Council, an employee representation plan which has worked very successfully in this plant both from the standpoint of carrying out a good safety program and in adjusting personnel problems in the plant. The Management representatives are chosen from the rank and file employees along with those representing and elected from the working force. Besides the easy freedom of expression which such a representation affords, the men naturally assume considerable responsibility for the successful carrying out of company policies. The safety committee is chosen from the members of the Mill Council. Its five members make regular inspections of the plant and all objectional features are brought to the attention of the departmental head of the offending department. If matters are not promptly adjusted, the problem is taken up by the Mill Council for a thorough airing. The recommendations made are included in the minutes of the meeting which are posted on the bulletin boards throughout the plant. However, since foremen are thoroughly sold on cleanliness and safety, cooperation with the committee is usually a foregone conclusion.

Work orders covering recommendations for guards, elimination of hazards, etc., are issued to the Maintenance Department through the dispatching system and are promptly taken care of. The ideas of employees are received and if the suggestions are meritorious they are carried out and put into effect and the

employee given due recognition for his suggestion. If the ideas are impractical the reasons for not adopting them are carefully explained to the individual.

Example of Foremen and Safety Committee

Foremen, as leaders in their departments, set an example for neatness by maintaining clean offices and working places and thus help to impress the workmen with the importance of maintaining a clean plant. Through the work of the safety committee and the leadership of the foremen, prompt attention is given to the installation of safeguards and minor repairs. In the program of safety attention is given to the proper storage and piling of materials and supplies. Stocks are piled neatly to increase the floor space and to reduce the wastage and damage resulting from improper storage. This also assists in simplifying the method of taking inventories of supplies and materials and decreases the fire hazard. The same care is maintained in storing lumber and materials in the ample mill yards. The plant has an adequate system of tracks for storage of empty cars for use in shipping its products and these tracks are kept in a constant state of good repair. The locomotive engineers and brakemen follow safety rules with the utmost care and there has not been a single accident charged to the train crew since the plant began operations.

Care in the Woodyard

Two woodyards are maintained by the plant with a total storage capacity sufficient for six months' operation. Incoming wood is brought by truck from the areas closer to the plant and by rail from the more distant sources of supply. Handling the heavy sticks of wood is a hazardous occupation because of the possibilities of slipping and falling, dropping sticks on feet, running splinters in the hands, etc., but the crew, well trained in safety, has made this department one of the safest in the plant by employing practices and methods of work scheduled to cut down accidents.

Summary

In the final summary, the favorable experience which the Harriman plant has had in accident prevention may be credited to its sustained program of education, pleasant working conditions, the responsibility which the foremen and employees assume, and the active backing of the chief executive in matters pertaining to increased safety, cleanliness, and efficiency. The good record was established by the united efforts of each individual employee striving to do all in his power to keep his own record clean and help the other man also in making the plant a clean, safe, and pleasant place in which to work.

History of Wall Paper Manufacture in Europe

RAFFAELE SANSONE

MURAL decoration is very old. It dates back to the epoch of the primitive man who relieved the monotony of the bare walls of his cave by draping them with the skins of animals, war trophies, etc. Later, with the development of textile arts, woven materials were used largely, and from the eleventh century to the middle of the eighteenth century, the tapestry industry flourished. Cloth painted in imitation of tapestry subsequently became popular, and it is but a short step from this to the use of paper as a base. Printing ink and ordinary hand presses were used at first, followed by the process of printing from hand blocks, which is still in use for particularly artistic effects.

The first uses of wall paper undoubtedly originated in the Far East, especially in China and India, as paper was produced there long before its introduction or use in Europe for any purpose, and whole walls put together, using paper in place of wood or stone, that were variously colored or ornamental.

In Europe, the covering of walls was introduced for the first time in 1600 through the initiative of people who had journeyed to the country of Confucius. Here the bareness of the stone walls formerly had been covered with woolen, linen and silk fabrics embroidered in silver and gold, or by worked leather, etc. Such works of art produced by Bauvais, the Gobelins, at Antwerp, at Florence and elsewhere, could be secured only by the richest; the middle class and the rest of the population had to be content with plastered walls. The wish, however, was born in the minds of many for some other ornamental means within the reach of all.

First Wall Paper in Europe

The idea of reproducing on paper the designs and motives contained on the above mentioned highly prized fabrics, which could be done at a much lower price, is attributed to the Frenchman, Le Francois, of Rouen, who in 1620 prepared a first essay of wall paper, the now precious and much searched for "tontisse," using for the purpose very fine wool wastes abandoned during the weaving of certain fabrics. The variously colored material thus secured was broken down into fine fibers through repeated combing operations and then distributed onto a paper ground on which designs had been covered with a wet adhesive that fixed the fibers to the wanted degree when dry. This produced in reality only velveted papers. Such paper is produced at the present time through an analogous process.

In Figure 1 is shown a small apparatus constructed by the German firm Prea, of Leipzig. Through this, powdered wool, silk or other fibers can be blown onto

long, glue-wetted paper bands, producing a perfect fibrous layer which forms a flannely or velvety surface. The size of the plant depends on the scale of production and width of sheet of paper treated. It is operated generally by a ½ hp. electric motor, and independently of compressed air. The firm supplies special tables on which the fibers can be applied to the band of paper

Figure 1

without being scattered into the air. Here the drying of the adhesive also can be conducted before rolling the sheet. A special fiber trimming can be secured through convenient machinery.

Figure 2 shows how the fibers can be spread loosely over an entirely wetted paper. Interesting fibrous designs can be produced by simply placing the adhesive in given designs and blowing or brushing the dried material after the application of the fibers and before winding. These designs can be varied as desired or rendered neater by an adroit cutting process.

Painted Wall Papers

Painted wall papers were produced principally in the Far East. In Europe, this type of paper was commissioned in certain cases as far back as 1700-1750, although it was found more convenient to paint and ornament the walls directly. And this practice is conducted even now through spraying and other processes.

As prepared in the Far East, painted wall papers are often real works of art, the genius of the painter being clearly exhibited. Since these papers were produced there at a lower cost than imitations made in other countries, the Europeans made use of them. The Oriental styles also were more attractive than those of the local painters who were not experienced and who lacked the inspiration needed to produce desired effects. However, the future in Europe may develop greater initiative resulting in the production of special wall papers, thus creating a new branch of the paper industry. Painted papers may then be brought within the reach of all.

Real European Wall Papers

Multicolored wall papers obtained through the printing process date from 1750, although it was only at the end of that century that the wall paper industry received a strong impulse through the Alsacian Zuber and Frenchman Durfour. The latter occupied himself with the artistic phase of his productions, and the landscaped tapestries he presented for sale in his time rival the prices now asked for old cloth brocades. It was due to the efforts and to the abilities of these two eminent men that the use of wall papers became general.

In the beginning, the same methods were used for printing wall papers in one or two colors that were employed for printing cloth. Sometimes this was done with wooden blocks more than a yard long on each of which was engraved the design to be reproduced. Another method, known as the "patron" process, consisted of covering the paper with metallic plates having cut-out designs. The color may be applied through the cut-outs in the plates by the use of a brush, wadding, or by spraying.

Hand or block printing is employed at present to a certain extent in some countries. Most printers use as many blocks as there are colors to be reproduced on the paper.

This process requires a long, very strong wooden table, the top of which is covered with felt and supplied with a lever-press and basins for the colors. These are use for wetting cloths of the size of the blocks. The operator spreads the strip of paper on the table, wets the block first in the coloring bath, places it flat on the

paper and covers the top with a small board. The small arm of the lever that has been attached to the table is then brought down upon the board thus exercising sufficient pressure to cause the color to be absorbed by the material. After it is released, the sheet is then passed forward and the printing process is repeated. With bands of 8 meters, not less than eighteen applications of the blocks in the most common dimensions are necessary.

The printing blocks are generally of hard wood and are capable of supporting the repeated pressures of the lever without losing their shape. Blocks of pear and beechwood give good results, although printers also are using blocks of copper, brass or hardened lead. There is great difficulty in obtaining continuous or followed designs in the full length of the material without losing a great deal of time. For this reason, printing costs are fairly high, even if cheap labor is available.

The advent of metallic plates for producing stencil designs did not reduce the cost of the coloring operations or reduce the work of the printer. Also, it was necessary in many cases to retouch the patterns for adding missing portions or to bring out certain details more clearly.

Mechanical Printing

More modern means have been substituted today for the hand printing processes and the printing of wall paper has become a very interesting branch of the paper industry. The engraved cylinders now used are similar to those used for textile printing (Figure 3). The operation of such plants has brought inexpensive papers within the reach of the poorer classes. Some of the mills produce more than 24,000,000 rolls of wall paper annually.

Many paper mills make hanging paper and sell it to other companies known as wall paper manufacturers. There are, however, mills that manufacture wall paper from the making of the pulp to the finished article. In producing low cost hanging paper, some of these mills add waste papers such as catalogue trimmings, office

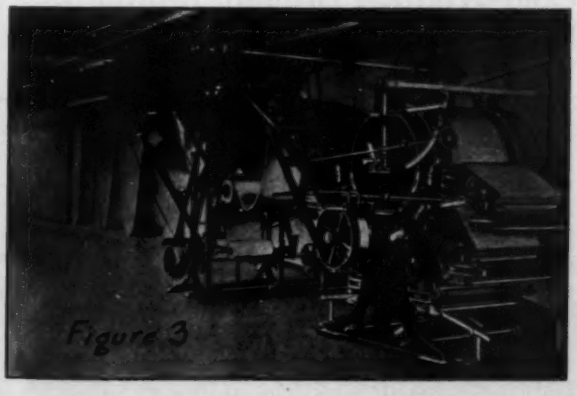


Figure 3

waste, records, old newspapers, etc. to groundwood and sulphite pulp.

In 1838, Bissonet built a small machine that was worked by hand and could be used only for printing in one or two colors. Ten years later, Dotter Brothers, of Manchester, constructed steam driven machines capable of printing in six or eight colors. Later, progress in England, Germany and elsewhere made it possible to build plants that would print more than 300 rolls of paper daily in twenty-four different colors, if required.

Preparing the Paper Before Printing

With the exception of wall paper of a very current type that passes directly to the printing machine without receiving any preparation, the untreated sheets are often subjected to a preliminary treatment which consists in deposing on one of the sides a uniform layer of color to serve as a ground. This is chosen to blend with the design to be printed, and it also serves the purpose of smoothing out the surface and preparing it to receive the color pastes besides increasing the strength and consistence of the paper. In some cases, coating machines apply a plain ground color to the entire surface of the paper, sometimes simply china clay, or the clay may be made still whiter by precipitating barium sulphate upon it, while in other cases tinted clays are used. If the ground coloration is produced in the whole mass of the paper, the printer secures colored paper from the paper mills.

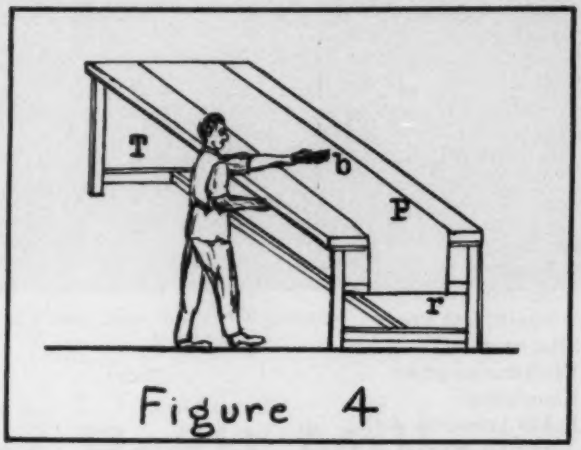


Figure 4

When the one side coating process was first introduced, the coating was applied by hand as shown in Figure 4. The regularity of the treatment depended on the patience and capacity of the operator. He used a brush to distribute the coloring and coating bath and carried the treated paper to the drying oven where it was hung by hand and left until dry. It was then passed through a calender. At present, however, the most convenient method is as follows: The band of paper is unrolled and passed over a cylinder. This cylinder is evenly coated with color by a system of brushes which operate with a transversal backward and forward movement. After wetting, the paper is carried to an oven, or to cylinders, where it dries rapidly and is again wound. When a polished surface is desired, this is obtained by calendering. However, polishing is not done extensively as it interferes with the adherent qualities of the coloring.

The paper is then ready for the real printing process in which color pastes or colors in oil of turpentine are used. The latter is used particularly for washable papers.

Coloring Materials and Their Application

Many coloring materials are employed in the making of printed wall papers. Some producers use only mineral colors or lakes of these, claiming that because of their insoluble condition they are especially resistant to the dampness of walls and to fading from strong light or noxious acids. The following list gives the colors commonly preferred:

Reds
Cinnabar
Minium
Red ochre
Chrome red
Carmine lakes
Alizarin red lakes

Greens
Chrome green
Lakes prepared with Scheele green
Schweinfurth green
Zinc green
Ultramarine green
Lime green
Lakes prepared with aniline greens

Browns
Sienna earth
Umbre earth
Van Dyke brown

Yellows
Chrome yellow
Ultramarine yellow
Naples yellow
Zinc yellow
Yellow ochre
Lakes on the basis of yellow aniline colors

Blues
Ultramarine
Prussian
Cobalt
Indigo lakes

Blacks
Lamp black
Gas black

Whites
Zinc white
Calcined sulphate of barium
Lithopone

Scheele's green (arsenite of copper), Schweinfurth green (acetoarsenite of copper) and its derivates, such as Imperial green, Vienna green, Metis green, etc. are still very much used in the production of printed wall papers owing to the brightness of the tints and to the exceptional covering power that is not possible with other greens, even the aniline lakes. Schweinfurth's green resists light better than the others.

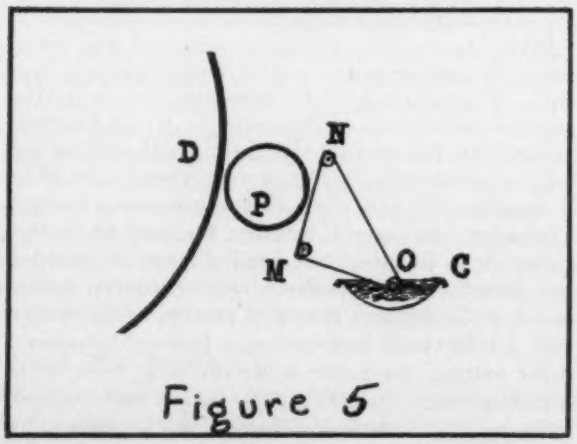


Figure 5

All of these colors that contain copper and arsenic are very poisonous and their use is justly prohibited in many countries. Gosio demonstrated that wheat flour pastes favored the growth of mildews on wall papers. This reduced the arsenic compounds freeing arsine (arsenic hydride), the poisonous properties of which are well known.

When applying mineral colors in the printing of wall papers, they are first made into a paste with water that is mixed with agglutinates such as leiocon, dextrin, gum arabic, animal gelatine, albumin, etc. Even viscose is sometimes employed, especially for obtaining particular effects. The proportion of the thickening is regulated to prevent the coloring matter from running, thus guaranteeing the neatness of the design and keeping the compositions at just the right density.

A special arrangement, such as is shown in Figure 5, permits the application of color on each cylinder of the printing machine. The arrangement shows paper carrying drum (D); printing cylinder (P); ink feed band supporting rolls M, N and O; and color trough (C). The number of cylinders on a machine may total two, four, six, ten or more. Each cylinder, while turning on its shaft, prints its design on the sheet of paper as it passes over carrying drum (D). Movement of the rollers and of the cylinders is activated through a gear arrangement that functions through the rotation of supporting shaft of drum (D).

Wall Paper Finish

Paper is sometimes given a special gloss or finish through passing between calender rolls, or it is otherwise finished to imitate leather, crocodile skin, cloth or crepe by passing between two specially engraved metallic cylinders, one of which has indentures, while the other has portions in relief. Very delicate reliefs such as flowers, leaves, etc. are obtained generally through pressure in the dry with horizontal presses that give finer effects than rolls. If extra brilliance is desired, a light layer of copal or shellac varnish is applied. Some French works use acetyl-cellulose for this purpose, furnishing wall papers somewhat resistant to water.

◆ ◆ ◆

Cold Weather Brings Printing Paper Troubles

With the advent of cold weather, printing papers require certain handling precautions not necessary during the summer months, according to advice from the National Bureau of Standards. Paper brought into the press room from freight cars, motor trucks or unheated warehouses during cold weather is usually many degrees colder than the room air. When the paper is exposed while still colder than the air, the edges absorb moisture rapidly by condensation from the warm air in contact with it, and wavy edges develop very quickly.

The results of tests with large piles of paper on skids and with paper in cases indicate that it warms very slowly. Paper 50 degrees Fahr. colder than the room air, required 96 hours to reach temperature equilibrium with the air. Hence, all paper brought into the pressroom from colder surroundings should be left sealed in cases, or covered with waterproof wrappers if on skids, for several days before exposing the paper to the room atmosphere.

Fig. 1—A bird's-eye view of the Bank of France paper mill at Vic-le-Comte

Bank of France Paper Mills

HARRY S. SPENCER
Manager Beauharnois Division
Howard Smith Paper Mills, Ltd.

A PAPERMAKER'S PARADISE awaited me on my arrival at the beautiful and picturesque little town of Vic-le-Comte, situated in central France. Here are made the artistic yet durable bank notes of the French Republic. A few miles distant at Clermont are the printing works where exquisite engraving, combined with clear watermarking, enables them to produce currency so well known for its high quality of workmanship.

The head office of the mills is located in Paris in the tremendous headquarters of the Bank of France. Here I had met the genial Mr. Schuhler, general manager, who with traditional courtesy had invited me to visit their paper mills and printing works.

Clermont is some distance south of Paris and I was met there by a car and spent the day with mill officials.

We enjoyed a few miles of delightful scenery through the Southern part of France, and on rounding the side of a mountain we came in full view of the mills at Vic-le-Comte as shown in Figure 1.

This bird's-eye view shows not only the picturesque surroundings but also indicates the exceptional ar-

Fig. 2—(left) Front entrance to the plant. Fig. 3—(right) A small portion of the rag room

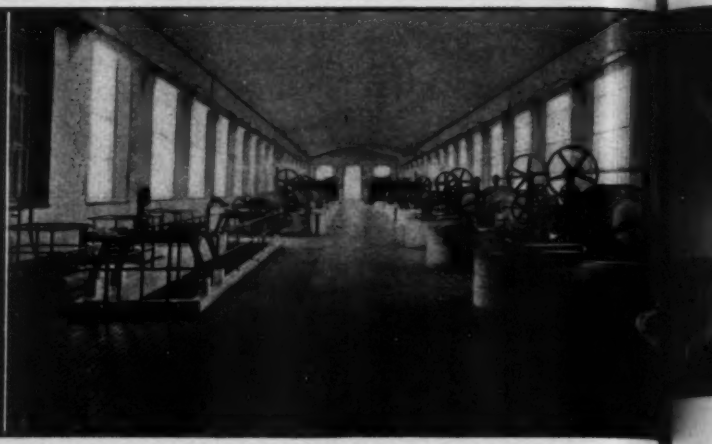


Fig. 4—(left) The rag washers. The walls, ceiling and floor of this room are tile. Fig. 5—(right) The beater room. There are no overhead beams where dirt may collect

rangement of the buildings which were designed and built by the Bank of France immediately after the War. A closer inspection of their mills makes one realize that the greatest of care was given to the entire layout as well as the actual design of the individual buildings and machinery.

Figure 2 shows the entrance to the paper mills and surrounding buildings.

On arriving at the front entrance to the mills, one is impressed with the well-kept appearance of the buildings and the beautiful lawns and gardens, all of which is a reminder that no matter what the French may build, the artistic touch is always present. While the photograph shows the fine appearance of the buildings and walks, it does not portray the beauty of the gorgeous flowers in their perfect setting of shrubs and green grass.

Figure 3 shows a small portion of the rag room which is not only modern in every detail but is laid out in excellent proportion to give ample space for each worker. Tiled floors make for cleanliness and good appearance. Adjustable lighting fixtures make possible the most favorable illumination, and even the artistic windows are equipped with curtains. I have never seen a rag room operating under such complete absence of dust as did this one.

The department for the preparation of half stuff is shown in Figure 4. Two long rows of rag washers are illustrated and the floor is completely tiled, using two types of tiles to improve the appearance and utility. The tiled walls and ceilings, which offer a minimum possibility for dirt collection, were spotlessly clean and the spacious high windows provided ample daylight.

From Figure 5 which shows the beater room, it will be noted that the two styles of floor tiling have been carried through in one harmonious design, and the electric light shades at the sides provide a type of lighting much superior to most mills. A complete absence of overhead beams or girders reduces the opportunity for dirt to collect and drop into the beaters.

Figure 6 hardly does justice to the excellent appearance of the wet ends of two of the special papermaking machines shown in the foreground but obscured by the tiled pillars. The majority of these machines are of the du Pont type which is entirely different from the better known fourdrinier and cylinder mold.

The present perfection of these magnificent machines was brought about by a Monsieur du Pont and Monsieur Schuhler, the present general manager.

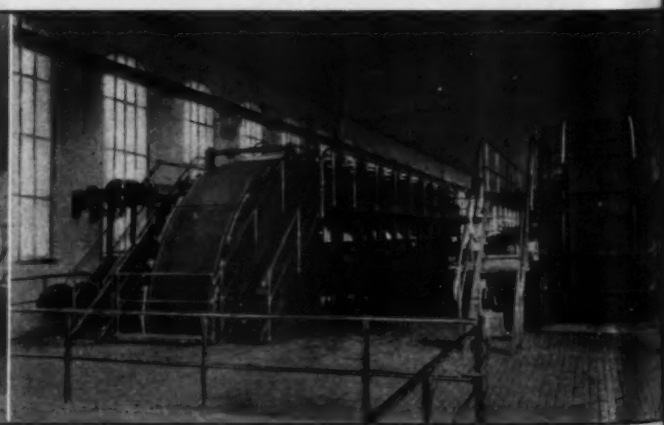


Fig. 6—(left) The wet end of the paper machines located on the first floor. Fig. 7—(right) The dry end of the machines on the second floor

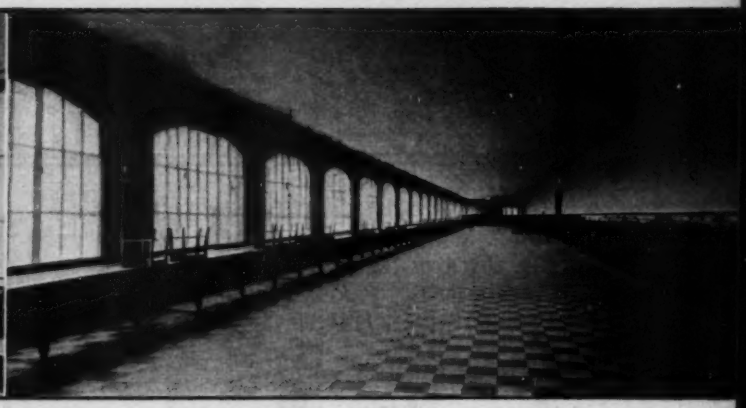


Fig. 8—(left) The finishing room where the sheets are first inspected. Fig. 9—(right) Final inspection takes place in this spotless sorting room

They consist of individual molds traveling on endless conveyors. The watermarked sheets are automatically couched off onto an endless belt which rises vertically to the second floor shown in Figure 6 where they are dried and removed in sheets. The forming molds with their necessary attachments represent one of the most beautiful examples of machinery I have ever seen. Entirely automatic in action, these wet ends are built practically entirely of bronze.

All gears, conveyor links, molds and reciprocating parts are fabricated from machined bronze, which has been given a perfectly smooth finish, and polished to present an appearance unequalled in any mill I have ever had the privilege of visiting.

Figure 7 shows the dry ends of two units on the floor directly above the wet ends. Here again ample space and lighting provide suitable surroundings for this splendidly designed machinery which brings the paper dried in sheets in neatly piled packs ready for subsequent treatment similar to practices used in European handmade paper mills.

The sizing and drying equipment are of the same high order as the machinery previously described, after which the sheets go to the finishing room illustrated in Figure 8, where they go through preliminary examination and subsequent operations such as needling, trimming, etc.

In Figure 9 is shown the sorting room where final inspection takes place. This, and the other illustrations, show the spotless appearance of this mill.

The writer wishes to acknowledge the kindness of the Bank of France, paper mill officials, and especially the courtesy of Mr. Schuhler in sending the photographs and granting permission to publish them.

Hints on Manufacture of Vegetable Parchment*

J. Melrose Arnot

VEGETABLE parchment is manufactured from unsized paper prepared from cotton rag fiber or from cotton linters or other pure form of cellulose, by treatment with sulphuric acid of 1.71 sp. gr. or 142 deg. Tw. concentration, followed by thorough washing with water, and drying. The parchment so made may be treated with hygroscopic substances, such as magnesium chloride, glycerine or sugar, to promote suppleness.

Imitation vegetable parchment or pergamin, on the other hand, is made mainly from specially cooked sulphite wood pulp and may be either unbleached or bleached. The pulp used is what is called a strong pulp, to distinguish it from the softer pulps more suitable for the manufacture of printings and ordinary kinds of writing paper. The finer qualities of the paper are only moderately sized with resin, the required characteristics being obtained by prolonged beating with blunt tackle (sometimes roll bars as much as one inch thick are used) or with basalt lava stone rolls or bedplates or both together, the furnish being as stiff as will circulate reasonably in the beater. The necessary wetness is about 80 deg. S.R. and may require as much as eight hours beating to attain. Pulp so prepared does not readily part with water on the machine wire, and therefore cannot be run at very high speeds. Shrinkage is very considerable, so that the trimmed width obtainable does not correspond to the nominal machine width.

To accommodate this shrinkage the drying cylinders should be arranged in small groups independently driven.

The dried paper is next subjected to heavy damping, and after the moisture has been allowed time to become diffused throughout the paper, it is subjected to heavy hot calendering. The result is a paper of great transparency, if all the operations have been conducted to that end—glass clear, and of excellent air, water and grease resistance.

Cheaper qualities are prepared similarly, but the beating time is reduced and resin sizing substituted to some extent. There are qualities which even contain a percentage of groundwood pulp.

(*) An excerpt from article published in November 13, 1936 issue of *The World's Paper Trade Review*.

Paper Sketches ---

IT WAS THE HUGE QUANTITY OF NOTICES, TORN DOWN NIGHTLY TO MAKE WAY FOR FRESH POSTERS, WHICH, IN THE EARLY 1700's FIRST SUGGESTED TO THE PARISIANS, THE MANUFACTURE AND USE OF PAPIER MACHE.

THE FIRST MANILA PAPER IS SAID TO HAVE BEEN MADE AFTER THE 1837 DEPRESSION BY LYMAN HOLLINGSWORTH OF SOUTH BRAINTREE, MASS., WHO, FINDING HIMSELF WITHOUT FUNDS TO BUY CUSTOMARY STOCK, CUT UP WASTE MANILA ROPES AND WORKED THE SUBSTANCE INTO PAPER.

AS EARLY AS 1040 A.D., THE GROCERS OF CAIRO, EGYPT, WRAPPED EVERYTHING THEY SOLD IN PAPER.

MORE THAN 1½ MILLION CORDS OF SOUTHERN YELLOW PINE WERE USED IN THE UNITED STATES DURING 1933 FOR PULP PRODUCTION. THIS QUANTITY APPROXIMATED 24% OF THE TOTAL WOOD CONSUMPTION AND EXCEEDED SLIGHTLY THE DOMESTIC CONSUMPTION OF SPRUCE.

Beating Pulp with High-Intensity Sound

STEPHEN A. BUCKINGHAM

Abstract

It has been found that a beating effect can be produced upon wood pulp by treatment of the pulp with high-intensity sound. A description of the apparatus is given and data are presented to show the magnitude of the effect. Other uses for high-intensity sound in the paper industry are suggested.

HIGH-INTENSITY sound is rapidly becoming of industrial importance. It has already invaded the commercial field in the ice cream business, where it is being used to produce a smoother mix. It is being used in the making of artificial soft curd milk, which is more digestible than most ordinary cows' milk, especially for babies. High-intensity sound can produce pasteurization also, without the necessity of heating, and has been found to have a mellowing effect on wines and liquors, similar to the effect of aging. It has been found very effective as a wetting and mixing agent for producing homogeneous suspensions of fine pigments.

With suitable apparatus for its application, high-intensity sound has proven a very effective homogenizer and a more efficient one than the ordinary pressure homogenizer, both with regard to the power required and the fineness of the emulsion obtained. Further, the sound homogenizer is extremely simple mechanically, having only one moving part. The one moving part is of such a nature that it is subject to almost no wear, so that its maintenance cost is practically negligible.

From the above facts it is evident that sound may become quite important in the paper industry. Mills which make their own size may do so in the future with sound instead of with the present complicated pressure homogenizer. Coating mills may use sound for making smoother and more homogeneous coating mixtures. Mills which make calcium carbonate as a by-product and use it as a pigment for loading and for coating, may be able to make a more finely divided, brighter product by using high-intensity sound as an agitator to retard crystal growth.

Probably the least promising application of high-intensity sound is in the beating of pulp. However, the work reported below shows that sound has a definite beating effect, though the effect found is regrettably small.

Table 1—Easy Beating Sulphite

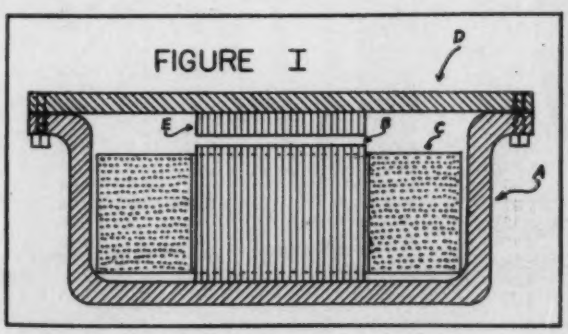
Sample No.	Slowness	Burst	Tear	Fold	Kw.hr./lb.	Per cent Consistency
Continuous Flow Process, Frequency 360 c.p.s.						
1	10.14	22.0	1.79	.061	.095	1.51
2	9.30	23.0	1.58	.066	.138	1.51
3	9.69	24.2	1.69	.074	.528	1.51
4	9.79	22.4	1.77	.059	.227	1.44
5	9.37	24.0	1.77	.082	.432	1.44
6	10.43	28.8	1.87	.111	.873	1.44
Batch Process, Frequency 1200 c.p.s.						
7	9.26	20.6	1.58	.062	.018	1.66
8	8.70	21.5	1.47	.058	.177	1.66
9	8.60	19.8	1.45	.058	.008	3.15
10	8.39	22.7	1.49	.054	.069	3.15
11	8.26	22.6	1.66	.069	.415	3.15
12	8.39	18.4	1.44	.044	.045	6.78
13	8.40	18.5	1.36*	.050	.132	6.78
14	9.92	22.1	1.56	.071	.415	6.78
Blank	7.37	18.0	1.43	.041		

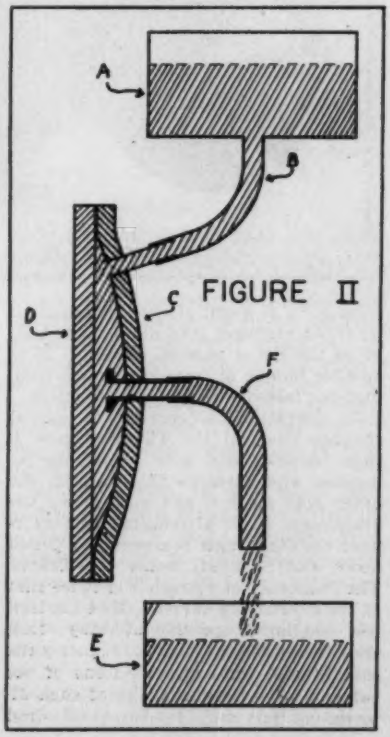
Explanation of Beating Effect

Sound is a wave motion which may travel from place to place in any elastic medium, such as air, water, steel, etc. At any point in the medium, the material of the medium is alternately compressed and expanded by the passage of sound through that point. The violence of the compression and expansion depend upon the intensity or loudness of the sound. If the sound is of sufficiently high intensity, cavitation may occur, in which case the expansion is so violent that a vacuum is created and this produces something like an explosion of the material of the medium into the evacuated space. Sounds have been produced in steel rods, violent enough to rupture the steel.

It probably will occur to the reader that a high-intensity sound source would be impractical for commercial purposes because of the noise involved. This is not true. The transfer of sound energy from one medium to another may be very inefficient if the two media differ greatly in elasticity and density. The differences in elasticity and density between water and air are such that the efficiency of transfer of sound energy is very low. As a result, if our high intensity sound source is in a tank of water, relatively little sound escapes into the surrounding air. Moreover, high-intensity sound sources are relatively small and easy to insulate so that the sound in the outside air may be made quite unimportant.

In the treating of pulp, the medium for the sound is a mixture of pulp and water. High-intensity sound passing through the mixture alternately compresses and expands it, subjecting it to





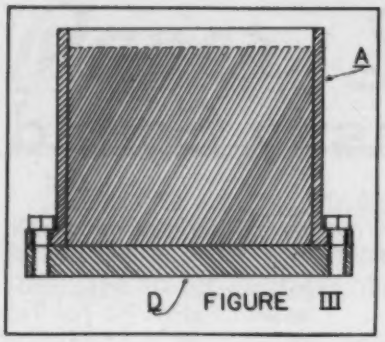


FIGURE III

a sort of pounding action which simulates the pounding given to pulp by a beater.

It is not to be expected that the action of sound will be exactly like that of the beater, since there is no tendency toward cutting. Microscopic examination of fibers which have been treated with sound, shows no apparent difference between the fibers which have been treated and those which have not.

Apparatus

The sources of high-intensity sound used in these experiments were of the type now being used commercially for homogenization. Figure 1 is a schematic diagram of such a sound source. *A* is a round iron pot. *B* is a bundle of transformer-iron laminations, fastened to the bottom of the pot and projecting upward from it. *C* is a coil of wire surrounding *B*. *D* is a stainless steel diaphragm, bolted to the pot *A* around its edge. *E* is another bundle of transformer-iron laminations fastened to the diaphragm *D*.

In operation, a current is passed through the coil *C*. The iron core *B* then becomes one pole of an electromagnet and attracts the iron of the other pole piece *E* and pulls down the diaphragm *D*. If alternating current is used, the diaphragm is alternately pulled down and released; hence it vibrates. The frequency of vibration is twice that of the alternating current, since the iron has negligible permanent magnetism and, therefore, the electro-magnet pulls equally well for both directions of the current. The diaphragm is of such dimensions that it is tuned to the desired frequency. The alternating current is supplied by a variable speed motor-generator set. The speed of the motor is adjusted so that the diaphragm resonates to twice the frequency of the generator. This condition produces the most violent vibration possible for a given electrical power input. When vibrating, the diaphragm acts as a source of sound. This type of vibrator is readily capable of producing cavitation in liquids such as water, when supplied with a suitable amount of power. A vibrator of this type, capable of radiating a kilowatt of acoustic power into an infinite water medium, requires an electrical input of about 1500 watts.

In these experiments, two vibrators were used in different ways, one for treating pulp by a continuous flow process and the other for treatment in batches. The set-up for the continuous process is shown diagramatically in Figure 2. *A* is a reservoir for the untreated pulp. *D* is the diaphragm of the vibrator. *C* is a slightly domed cap, clamped to *D* around its edge, and having two holes through it, one in the center and one near the edge. *E* is a receiver for the treated pulp. *B* and *F* are pipes leading into and out of the cap. In operation, the pulp flows from the reservoir, through the pipe *B*, into the cavity made by the diaphragm *D* and its cap *C*. From the cavity, the pulp flows out through pipe *F* into receiver *E*. This method permits treatment on a continuous flow basis and insures that all of the pulp leaving the cavity must flow over the center of the diaphragm and hence through the region of most intense agitation.

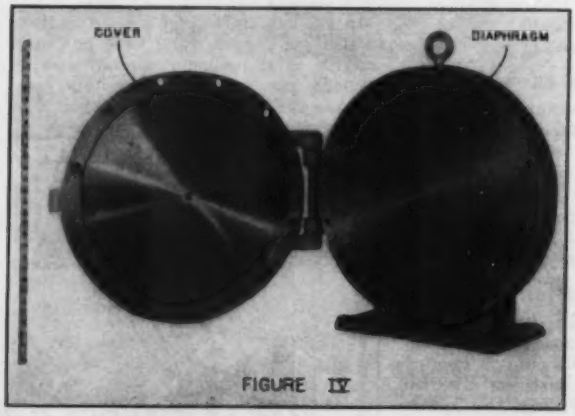


FIGURE IV

Figure 3 is a diagram of the batch process apparatus, in which *A* is a flanged steel cylinder, bolted to the diaphragm *D* at its edges, so that *A* and *D* form a water tight container. In operation, the pulp was placed in *A* and the vibration of the diaphragm *D* radiated sound upward through the pulp.

Figures 4 and 5 are photographs of a 360-cycle, one kilowatt sound source of the type used for the continuous flow treatment of pulp. Figure 4 shows the sound source with its cover open for cleaning, while Figure 5 shows it closed, ready for use.

Figure 6 is a photograph of a 1200-cycle 500-watt sound source, partially disassembled. The source shown has a cover for the diaphragm for the treatment of fluids under continuous flow. This type of source was used for the batch treatment of pulp. For this purpose the flanged steel cylinder *A* of Figure 3 was substituted for the cover.

Experiments

In these experiments, three types of pulp were used, an ordinary easy-beating sulphite, a high-alpha sulphite, and a soda. All three pulps were bleached. The sulphite pulps were in dry lap form and were disintegrated by the use of a high-speed water jet against the bottom of a sieve, on which the laps were placed. The soda was available in slush form. The disintegrated pulp was mixed with more water to bring it to the desired consistency. A part of the mixture was kept as a reference standard and the remainder was treated with sound. The flow pipes available for the continuous flow method were too small to permit the free flow of stock of high consistencies. The limit was about 1.5 per cent in the case of the sulphite pulps and about 3 per cent for the soda pulp. In the batch method the approximate range of consistencies was 1 per cent to 8 per cent. The stock was treated from one to thirty times by the continuous flow method and for times varying from thirty seconds to twenty-one minutes by the batch process.

Tests for Beating Effect

All treated samples, together with their reference standards, were subjected to the usual tests to determine the amount of the beating effect. A part of each sample was used to determine the slowness and the remainder was made into sheets, which were tested for burst, tear and fold. From several of the most

Table 2—High Alpha Sulphite

Sample No.	Slowness	Burst	Tear	Fold	Kw.hr./lb.	Per cent Consistency
Continuous Flow Process, Frequency 360 c.p.s.						
15	4.26	5.42	.486	....	.472	1.46
16	5.06	5.62	.397	....	.944	1.46
Batch Process, Frequency 1200 c.p.s.						
17	4.34	3.81	.355*	....	.021	0.83
18	4.24	4.06	.448	....	.099	0.83
19	4.05	4.90	.409	....	.177	0.83
20	4.42	4.84	.434	....	.912	0.83
21	4.23	4.13	.413	....	.225	1.02
22	4.49	4.97	.416	....	1.383	1.02
23	4.10	3.95	.416	....	.131	4.08
24	4.12	4.27	.336*	....	.696	4.08
25	4.22	3.73*	.365	....	.008	8.15
26	4.38	3.97	.356*	....	.022	8.15
27	4.41	4.30	.388	....	.123	8.15
28	4.22	4.20	.364	....	.730	8.15
Blank	3.96	3.77	.363	....		

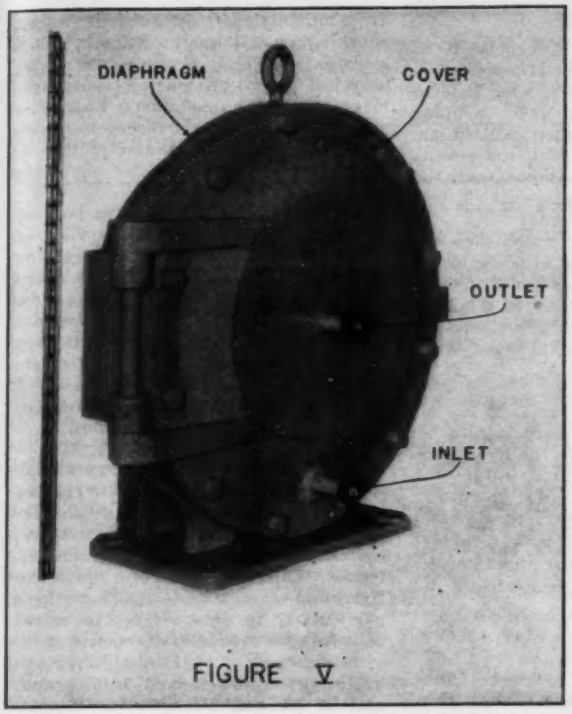


FIGURE V

heavily treated samples shrinkage sheets were made also but, as these showed only random differences from the shrinkage values of the untreated pulp, this test was omitted on most of the samples. The testing instruments used were the Williams slowness tester, the Ashcroft burst tester, the Elmendorf tear tester and the M.I.T. fold tester.

In order that comparisons might be made among results of the tests on the various samples, corrections were made for pad weight in the case of slowness tests and for basis weight in the case of tests on hand made sheets. The slowness values were corrected to the standard condition of a two gram pad, as is customary with the Williams slowness test. The burst, tear and fold values were corrected to a 50-lb. basis weight. The results presented below all represent corrected values.

Results

The results of the tests on the various samples are contained in Tables 1 to 3. In these tables, the first five columns are self explanatory. The notations in the last column indicate the consistency at which each sample was treated. The next to last column, marked Kw.-hr./lb., gives the number of kilowatt-hours of electrical energy consumed per pound of pulp treated. These figures are included in order to give some idea of the efficiency of sound in producing beating, and of the relative efficiencies of different conditions of treatment. The value of the Kw.-hr./lb. is computed from the consistency and volume of the pulp suspension when treated, together with the time of treatment and the electrical power supplied to the vibrator. In the batch method, the time of treatment was measured directly, while in the continuous flow method the time was computed from the volume of the sound cavity, the rate of flow of stock, and the number of passages of the stock through the system.

The values of the tests made on the untreated reference standards are given at the bottom of each table. These values are marked "Blank."

It will be observed that the "Fold" columns of Table 2 is vacant throughout. The cause of this is the fact that the hand sheets made from the high alpha sulphite had too low a tensile strength to permit the making of the folding test.

The slowness values in the tables represent the average of from 2 to 10 slowness tests on each sample. The average number of tests was 5. The burst, tear and fold values are the average of the results of tests on a number of sheets. The number of sheets varied from 6 to 44, the average being 16 sheets per sample.

Table 3—Soda

Sample No.	Slowness	Burst	Tear	Fold	Kw.hr./lb.	Per cent Consistency
Continuous Flow Process, Frequency 360 c.p.s.						
29	28.4	35.9	.817	.053	.129	2.84
30	28.8	35.5	.791	.055	.319	2.84
Batch Process, Frequency 1200 c.p.s.						
31	26.6	31.2*	.778	.042*	.033	4.10
32	26.7	31.7*	.653*	.045	.223	4.10
33	25.2	32.8	.743	.049	.017	7.03
34	24.4*	33.6	.690*	.046	.116	7.03
Blank	25.2	32.6	.702	.045		

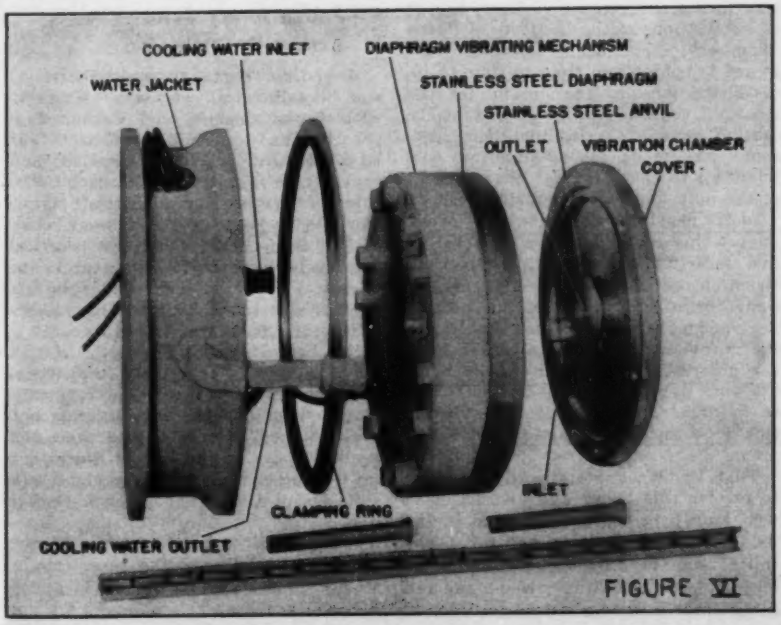


FIGURE VI

Discussion of Results

Examination of the tables will show that, in general, treatment of pulp with high-intensity sound raises all the tests, even including the tear. It is usual with beating in the beater that the tear should rise slightly in the early stages before beginning to fall. The beating effects on slowness, burst and fold are of a magnitude corresponding with the early stages in the beater. Thus the rise in tear with sound treatment is not anomalous.

Certain entries in the tables are marked with an asterisk (*) and it will be seen that in each case the entry marked is lower in value than the corresponding entry for the untreated reference standard. There are eleven of these marked entries, one each in the "Slowness" and "Fold" columns, three in the "Burst" column and six in the "Tear" column. There is nothing anomalous in the low values of tear, since

tear is usually reduced by beating. In the case of the marked values of slowness, burst and fold, the probable error of each value was computed from the test data. The probable error of the corresponding value for the reference standard was also computed. In each case, the sum of these probable errors was greater than the difference between the treated and untreated values.

A mixture of pulp and water absorbs sound, so that the intensity of the sound in the stock falls off rapidly as the distance from the diaphragm increases. The result is that the stock near the diaphragm receives practically all of the treatment and we have a batch of stock, a little of which has been treated heavily, while the rest has hardly been treated at all. This condition might be remedied by effective stirring but the only method of agitation available during these experiments was hand stirring with a stick and this could not always be thoroughly effective. This is a condition which could not occur in the continuous flow process, because in that process all of the stock necessarily received the same treatment. This fact affords an explanation of the occurrence of the low values, for it will be noticed that all of the entries marked with an asterisk (*) and all entries not marked, which are nearly equal to the reference standard values, occur in the batch process.

Efficiency

Data were available for each of the pulps used, giving the variations in slowness, burst, tear and fold with time of treatment in a beater under average conditions in a book paper mill. Comparison of those data with the results of these experiments shows that the beater is from 2 to 150 times as efficient as is high-intensity sound.

The conditions under which these experiments were performed were by no means ideal and it is possible that more effective methods of treatment might be devised which would improve the efficiency of the high-intensity sound method of beating.

Conclusions

As a result of these experiments, we may safely conclude that the irradiation of a mixture of fiber and water with high-intensity sound does produce a beating effect. However, considerable improvement in apparatus or technique will be necessary before high-intensity sound can be used economically for commercial beating.

Acknowledgment

The author is indebted to E. W. Smith, of the Submarine Signal Company of Boston, with whose apparatus and in whose laboratory the pulp treatment was carried out.

◆ Robertson Made Chairman Southeastern Supers

At the fall meeting of the Southeastern Division of the American Pulp and Paper Mill Superintendents Association, held at Lynchburg, Va., October 30 and 31, R. B. Robertson, Jr. was elected chairman for the coming year.

Other officers elected were: Wm. H. Teter, Mead Corporation, first vice chairman; A. J. Foley, Hummel-Ross Fibre Corp., second vice chairman; Carl Jaents, Champion Paper & Fibre Co., secretary-treasurer.

Approximately 75 members and guests were in attendance at the meeting. At the business sessions, a number of interesting papers were read, and there also were presentations by stereopticans and motion pictures.

◆ MacNaughton Returns to Newsprint Bureau

R. S. Kellog, secretary of the News Print Service Bureau, New York City, has made official announcement that W. G. MacNaughton has returned to the position of Engineer of the Bureau, which office he held during the years 1928 and 1929.

Mr. MacNaughton has been connected with the paper industry in the United States and Canada for 28 years. He graduated from McGill University in 1904 as a chemical engineer. He was one of the organizers and the first vice president of the Technical Association of the Pulp and Paper Industry and was secretary of that organization from 1921 for a period of six years. After serving for a time with the News Print Service Bureau, he was associated with the International Paper Company. For the past four years he has been connected with the experimental Pulp and Paper Laboratory at Savannah, Georgia.

◆ T.A.P.P.I. Medal Awarded to C. J. West

The Executive Committee of the Technical Association of the Pulp and Paper Industry has announced the award of its gold medal to Clarence J. West, Editor of Publications of the Institute of Paper Chemistry, Appleton, Wisconsin. This award is made from time to time to individuals, who in the opinion of the T.A.P.P.I. Awards Committee and the Executive Committee (by unanimous consent) has made an outstanding contribution to the technical advancement of the pulp and paper industry.

In its nearly twenty-two years of existence this award has been made to but five individuals: namely, William H. Mason, inventor of the Masonite process; Ogden Minton, inventor of the vacuum pulp and paper drier; Ernst Mahler for the development of several paper making processes; Edwin Sutermeister for his work in paper making chemistry and to William Millspaugh for his invention of the suction roll and related equipment.

That Dr. West is eminently qualified to receive this honor and distinction is well known in the industry and in the field of bibliography in general. The initial step in all real research is to find out what has already been done and discovered in a certain field in order to avoid duplication. Because of Dr. West's efforts along this line no industry has a more detailed and clearer record of its technical and manufacturing assomplishments than the medallist. From the year 1900 to date, this record has been built up and made available to the industry for the benefit of its engineers and other research men.

Dr. West began this work as head of the research information service of Arthur D. Little, Inc. in Cambridge. The work was continued for the benefit of the country during the War by him as Lieutenant Colonel of the Chemical Warfare Service and since then until this year for the benefit of research investigators in all lines of scientific activity as head of the research information department of the National Research Council in Washington, D. C.

Dr. West has edited many outstanding scientific books, the most noteworthy being the Critical Tables, a fifteen-volume masterpiece giving the physcial and chemical constants for all known materials. This has been a world-wide activity and a necessity to enable workers, particularly in pure science to extend knowledge in the realm of scientific data.

As chairman of of the T.A.P.P.I. Committee on Abstracts and Bibliography and as an abstractor for the famous "Chemical Abstracts" he has saved the time of countless technical men who needed to be kept informed concerning the accomplishments of other investigators in all nations of the world.

Dr. West has recently joined the staff of the Institute of Paper Chemistry as Editor of Publications and in this capacity will be able to give his full attention to the compiling and analysis of the literature relating to pulp and paper.

The T.A.P.P.I. medal will be presented at the annual meeting of the Technical Association of the Pulp and Paper Industry at the Waldorf-Astoria Hotel in New York, February 22 to 25, 1937.

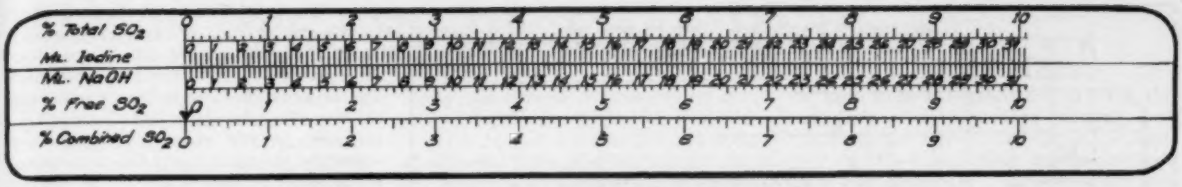
◆ Julian Avery Joins Arthur D. Little, Inc.

Mr. Julian M. Avery, electro-chemical and metallurgical engineer, formerly with Union Carbide and Carbon Corporation, has joined the staff of Arthur D. Little, Inc., research chemists and engineers of Cambridge, Massachusetts.

Mr. Avery is a graduate of Massachusetts Institute of Technology, class of 1918, and obtained his first practical plant experience as a Lieutenant in the Chemical Warfare Service under the late Colonel William H. Walker, who was one of the early partners of Dr. Little.

Mr. Avery brings to Arthur D. Little, Inc., a wealth of experience in practical plant operation, research developments, patent work and the investigation and evaluation of inventions and processes, acquired both in the United States and in Europe while serving various subsidiaries of Union Carbide and Carbon Corporation.

Mr. Avery is a member of the Electro Chemical Society and the American Institute of Mining and Metalurgical Engineers.



This illustration of sulphite acid slide rule is one-half of actual size

A Sulphite Acid Slide Rule

O. K. GRAEF

IN THE sulphite acid plant testing station it is customary to keep records, at uniform intervals, of the strength of the acid. The method of procedure is to titrate 1 ml. samples of the acid with decinormal solutions of iodine and sodium hydroxide and the percentage total of SO_2 and free SO_2, respectively, calculated from the relations

$$T = 0.32\ I$$
$$F = 0.32\ A$$

and then calculating the combined SO_2 from the relation

$$C = T - F$$

Where T is per cent Total SO_2
F is per cent Free SO_2
C is per cent of Combined SO_2
I is Milliliters Iodine (N/10 solution)
A is Milliliters Sodium Hydroxide (N/10 solution)

Ordinarily a common or Mannheim slide rule is used, and when this is the case, two settings of the slide and a mental subtraction are required to solve the three equations with the result that errors are likely to creep in. If a slide rule is designed to solve these equations simultaneously many errors may be eliminated.

All slide rules operate by means of adding or subtracting distances which are proportional to the values of the functions represented by their scales. Thus if

Dv is a distance proportional to a function of V
Dx is a distance proportional to a function of X,

then the equation Dv — Dx = 0 could be solved by an arrangement of proportional distances as shown by Figure 1.

If a third term is added, as Dy

Dv — Dx — Dy = 0, then the scale arrangement necessarily would be as in Figure 2.

From the graphic arrangement of the equations, it can be seen that all scales must be constructed on the same base or modulus, and that the arrangement of the scales on the rule may be arbitrary, that is, the scales representing V, X and Y may be placed on the rule in the most convenient manner, and need not be placed according to the order of the terms in the equation.

Returning to Figure 1, it is obvious that a so-called fixed scale will solve the equation given, and Figure 3 is a representation of such a fixed scale made to a base or modulus of 1 inch. By inspection, it appears that this is the form of scale required to solve the equations $T = 0.32\ I$ and $F = 0.32\ A$, or $T-0.32\ I = 0$ and $F-0.32\ A = 0$, respectively.

Care must be exercised not to select a base or modulus so great that the available wooden slide rule blank will be too short, or a modulus so small that the scales do not cover the full blank. In the first case, the upper end of the scale will fall off the blank, and in the second case, accuracy will be lost through the use of too fine a scale.

The first step is to determine limits for the values of I, A and C. For the rule illustrated, these limits were assumed as follows:

I to range from 0 to 32
A to range from 0 to 32
C to range from 0 to 10

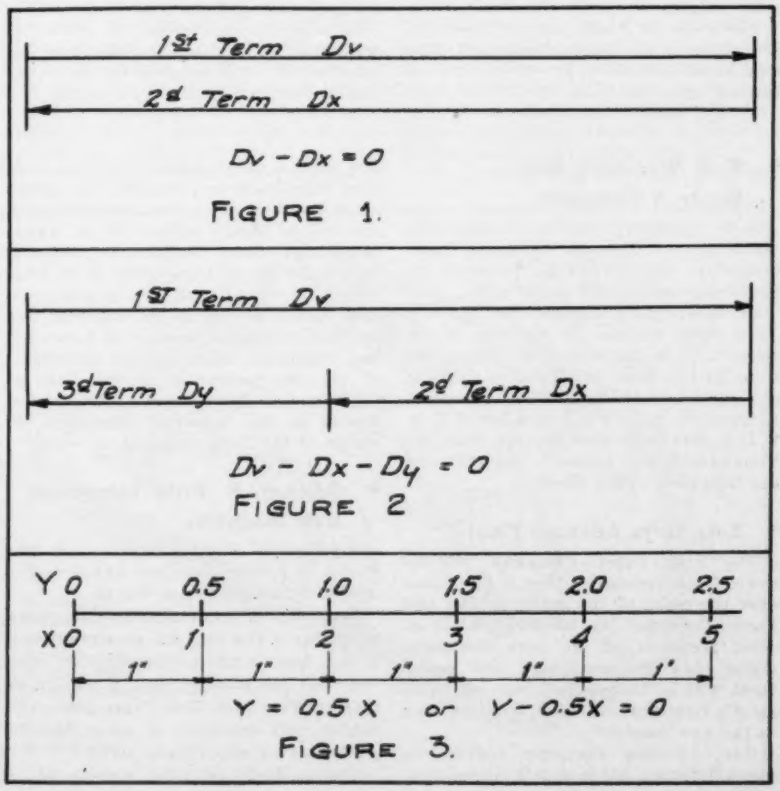
If a wooden blank 12 inches long is available, perform a test calculation to determine the total length of the scale, assuming a modulus or base of 2 inches. That is, every full division of the scale will be 2 inches.

Then $T = 0.32 \times 32 \times 2'' = 20.48''$

This is considerably more than the length of the blank, hence a new base must be found. One-half of 20.48 inches is 10.24 inches, which is within the length of the blank, and a half of base 2 inches is 1 inch, which is the base length to use.

Next, with an engineers' scale graduated to tenth inches, proceed to lay out a scale for I, as shown in Figure 4. This may be simplified if a set of master calculations are performed as follows:

When T = 0	1	2	3	4	5	6	7	8	9	10	etc.
0.32 I = 0	.32	.64	.96	1.28	1.60	1.92	2.24	2.56	2.88	3.20	etc.


1st Term Dv
2d Term Dx
Dv - Dx = 0
FIGURE 1.
1ST Term Dv
3d Term Dy
2d Term Dx
Dv - Dx - Dy = 0
FIGURE 2
Y 0 0.5 1.0 1.5 2.0 2.5
X 0 1 2 3 4 5
1" 1" 1" 1" 1"
Y = 0.5 X or Y - 0.5X = 0
FIGURE 3.

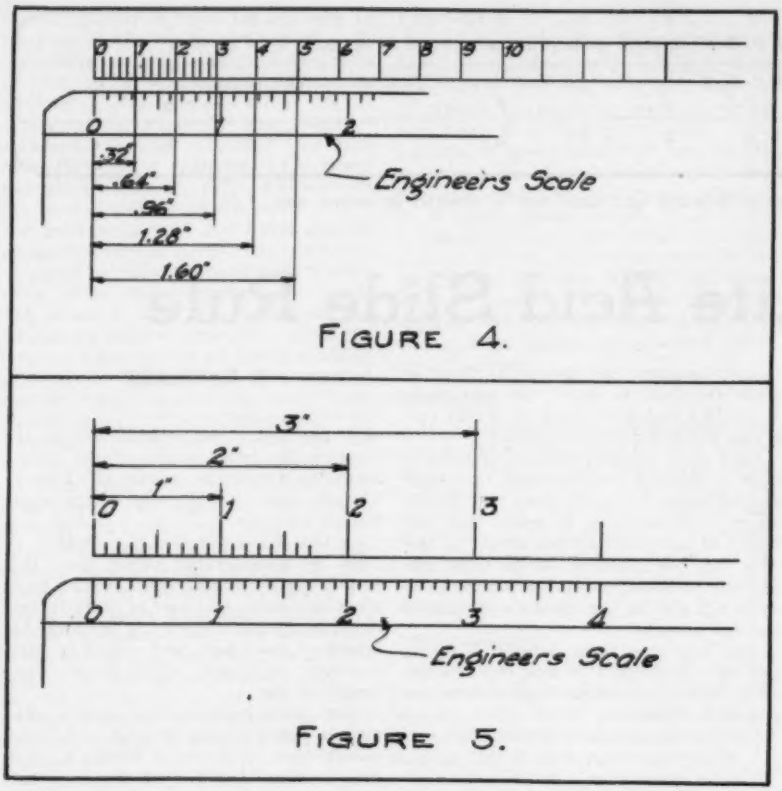


FIGURE 4.

FIGURE 5.

The per cent Total SO_2 scale may be next made, and since a 1-inch modulus has been determined upon, it may be drawn in directly from the engineers' scale (Figure 5).

The scale for A and per cent Free SO_2 are made in an identical manner. The final equation is $C = T - F$ and this is thrown into the form $T - F - C = 0$, which is the form of Figure 2. This is a simple subtraction, and from the rule that all scales must be to the same modulus, the 1-inch modulus used for the previous scales is used.

In order to determine the direction and order of the scales, a key may be constructed. The symbols of the equation are written in a vertical column in the order in which it is desired they appear on the rule. Arbitrarily, plus and minus signs are placed before and after the symbols in an alternating manner. The equation must be written so that the order of the symbols in the equation corresponds to the order in which they appear in the column and the index must be included in the column in its proper place. Then the direction of increase of the scales will be indicated by an arrow placed at the sign which corresponds to the sign of the function in the equation. In this case

$$T - F - C = 0$$
$$-T+\rightarrow$$
$$+F-\rightarrow$$
$$-\text{Index}+$$
$$+C-\rightarrow$$

Thus all scales increase to the right, T being on the upper part of the stock of the rule, F and the index on the slide, and C on the lower part of the stock. If another arrangement were desired the equation might be written $C + F - T = 0$, and the key then would be

$$-C+\rightarrow$$
$$+\text{Index}-$$
$$-F+\rightarrow$$
$$+T-\rightarrow$$

In this case, all functions would increase to the right as before, but the position of the index and the scales on the rule would be changed, although the rule would solve the same equation.

The rule illustrated in Figure 6 was made with the first arrangement, as it seems somewhat easier to handle. The method of operation is to read the per cent Free and Total SO_2 directly and then to set M1. I to M1. A and read per cent Combined SO_2 directly under the index. Thus in Figure 6 the rule reads

15 M1. I = 4.8% Total SO_2
5 M1. A = 1.6% Free SO_2

Under the index read 3.2% Combined SO_2.

◆ E. N. Wennberg With Moore & Thompson

E. N. Wennberg has just become associated with the Moore & Thompson Paper Company, Bellows Falls, Vermont, as superintendent of the paper mill.

Mr. Wennberg graduated from the New York State College of Forestry, Syracuse, N. Y., in the class of '29. Since that time he has been employed as chemist at Continental-Diamond Fibre Company, Bridgeport, Pa. He is a member of T. A. P. P. I., and in the past several years has been particularly active in the affairs of the Delaware Valley Section.

◆ Sorg Buys Advance Plant

The Sorg Paper Company, Middletown, Ohio, announces that it has taken over the plant of the Advance Bag and Paper Company, in Middletown. J. A. Aull, president of the Sorg Company, states that the machinery and equipment will be transferred from the company's Superior-Lawrence Bag Division to the new location.

The Advance Company moved its manufacturing plant South some time ago and the Middletown plant has been used principally as a distributing center since that time. It is a modern structure and will be ideally suited for the manufacture of Sorg Company's products. This is the second transaction of its kind within a year for the Sorg Company. Last May it purchased the Superior Bag and Paper Corporation and the Lawrence Bag Company, consolidating operations of the two companies at the plant of the Lawrence Bag Company. This is now known as the Superior Lawrence Division of the Sorg Company.

◆ Edward B. Fritz Introduces New Magazine

Edward B. Fritz, publisher of THE PAPER INDUSTRY, has just announced a new publication, *Paper World*.

Paper World is intended to be the newsmagazine of the pulp and paper industry. It will have a distinct personality, modern—but not bizarre—and it will in no way conflict with THE PAPER INDUSTRY, which will continue to serve the industry as an educational journal.

Paper World will be known as "A Monthly Review of the News of the World About Paper and Pulp." The trim size will be 8½ in. by 11½ in., with type pages standard at 7 in. by 10 in. This magazine will have a controlled (free) circulation of 7500 readers, reaching practically every official and key man in the pulp and paper industry.

The first issue will be dated February, 1937.

◆ Union Bag to Build Third Unit

A current press report states that the Union Bag and Paper Corporation has approved the construction of the third unit of the company's new kraft mill at Savannah, Ga. This unit will cost $3,500,000, including $300,000 for the purchase of new timber lands. It will have the same capacity as each of the first two units, or 40,000 tons of kraft paper annually.

In addition to the pulp required for its own paper production, the Savannah plant when completed will produce 50,000 tons of pulp for use in the company's northern mills.

The Smith-Egan Beaters

THE Smith-Egan beaters are designed for either continuous or batch operation. The continuous beater is essentially a beating and hydrating apparatus composed of two or more beater roll units in series, while the batch beater utilizes only one roll and a circulating tub.

The three roll design of the continuous beater has so far proven most useful. This design consists of three conventional type rolls arranged in a vertical stepped or horizontal relationship with each roll being completely enclosed in a chamber except for a stock inlet and outlet. Under some conditions, a vertical stepped relationship in reverse order might be advisable.

Each roll has a bedplate which embraces a substantial arc of the roll. This bedplate can be in three or more sections with each section being approximately equal to the ordinary Hollander bedplate.

The base for each chamber in which the bedplates are set can be formed of concrete. Cast iron, steel or wood construction in some cases, might be better.

The top wall of each chamber (wood or iron construction) extends concentrically over the top of the roll. It is constructed to provide uniform space in the portion of the chamber not occupied by the bedplate.

The inlet for the first chamber is placed adjacent one end of the roll so that the stock flows under pressure tangentially toward the roll. The outlet for this chamber is adjacent the other end of the roll and opens directly to the second chamber, the flow of stock being by gravity and pressure into the next chamber. The second chamber inlet, therefore, is adjacent to the first chamber outlet; the outlet for the second chamber adjacent to the inlet for the third chamber; and so forth, according to the number of chambers in any particular installation.

The stock source for any series of chambers consists of a typical headbox unit or any device that can furnish slush stock uniformly in amount and pressure.

The final outlet for the series of chambers can consist of one of several types of devices. The simplest is a moveable dam gate that causes the stock to flow over a baffle wall, raised or lowered to obtain the desired back pressure.

Under present practice the roll is rotated at conventional speeds and in the same direction as a Hollander type beater.

The stock is carried from the inlet directly to the bedplate. The pressure of the stock (head and back) tends to drive the stock over and across the roll in a spiral fashion, with the result that the stock passes between the bedplate and roll a number of times before reaching the outlet of the chamber. This same action is repeated in each subsequent chamber, until the stock reaches the final outlet and flows to a chest.

In a three roll unit, it would be possible to install three different types of roll and plate fillings. Thus it is possible to combine in one machine the advantages of different types of fillings according to the condition of the stock at the time it passes through each chamber. The first roll can be set and filled to complete the disintegrating and separation of fibers; the second roll can be filled and set to brush lightly; the third roll can be filled and set to hydrate severely or the second roll can be filled and set to hydrate, and the third to cut. In fact, a multiplicity of combinations are possible.

This beater has been successfully operated at conventional consistencies (three to six per cent) and up to eight per cent. It is believed that higher is possible and further experiments are being conducted to prove results. It is even possible to change consistency during the beating operation. This introduces to beating a wide factor of variation in operation and control of results that has almost limitless possibilities.

Each roll can be set independently of the other units. Setting is accomplished by a balance weight putting downward leverage on the roll shaft. The roll once set for desired results does not have to be changed; or desired roll setting once determined can be repeated at will.

The rotation of each roll can be controlled independently. This makes it possible to vary the back pressure of the preceding chamber or head pressure to the next succeeding chamber.

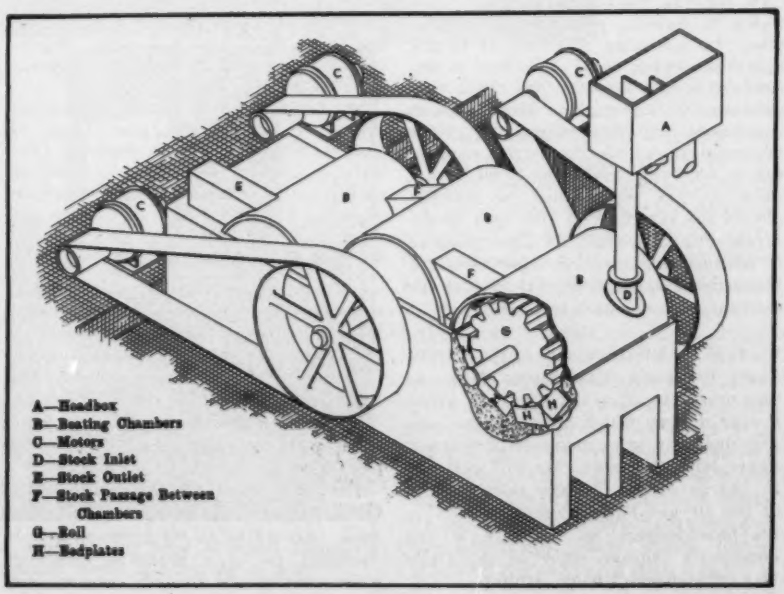
Head pressure can be arrived at and controlled by various means. One type of control would be a headbox with baffle dams (adjustable if desired) with a pipe inlet to the beater so constructed as to give the quantity desired at any given pressure. Back pressure is affected and controlled by the speed of the roll and the pressure built up at the outlet. The net effect of head pressure and roll speed minus back pressure will control the quantity of stock passing through each chamber per minute, as well as the number of times each fiber passes between roll and bedplates. This pressure balance is substantially the production control lever (quantity). If it is desired to have quantity of output at a constant figure, then other variations permit control and variation of hydrating effect. However, this pressure balance can be used as a quality control if so desired and production of any given amount can be obtained by other variables in the apparatus.

Power requirements of the Smith-Egan continuous beater is estimated conservatively at 35 per cent less than that ordinarily required. The beater also represents a lower investment when calculated on a basis of tons handled per day. At the same time, it permits a saving of from 15 to 25 per cent on floor space. Wear on tackle is low because of little contact and practically no friction of beater parts.

The beating chamber of the Smith-Egan batch beater is constructed along the same lines as each chamber in the continuous unit, the tub being a separate stock container independent of the beating chamber. Stock is furnished to the tub in slush or semi-slush form. This tub is similar to the present type of Hollander beater tub with a midfeather about three-fourths of its length. The bottom of the tub, however, is of a sharp pitch to facilitate gravity flow.

The stock drops into a pump below the tub and is pumped to a headbox above the beating chamber. The beating chamber is located across one end of the tub at three to six feet above stock level; while the headbox, according to the constant head pressure desired, is three to ten feet above the beating chamber.

The stock flows by head pressure



through a pipe inlet adjacent to one end of the beating chamber. After passing between the bedplate and roll, the stock comes up over and then around the roll through the plates and roll again. The flow of the stock in spiral fashion around and across the roll repeats the beating action a number of times.

When the stock reaches the other end of the roll it passes over a dam (controlling back pressure) and drops to the tub. The stock then flows around the tub and thus back to the pump. The construction of the tub is such that no pockets are formed and all stock is treated uniformly.

The capacity of the batch beater is variable according to results desired and the number of times it is necessary to pass the stock through the beating chamber. Circulation, however, is very rapid because of the efficiency and capacity of the pump, the quick action of the beating chamber, and the sharp pitch of the tub bottom.

It is the desire of the inventors that the benefits of this apparatus be available at low cost to the entire paper industry. Several manufacturers have already contracted to manufacture and merchandise this equipment under the Smith-Egan patent. While it is recommended that licensed manufacturers be contacted for further information, the inventors will be glad to furnish further data if requested.

◆ ◆

◆ Research Laboratory for Screening Problems

With the establishment of a research department, strictly for use of industries, by the Productive Equipment Corporation, 4600 S. Kedzie, Chicago, comes a service long needed in the art of screening. This laboratory performs a new service free to all industries, filling a gap for those who do not maintain their own laboratory.

"The chief need for a Research Laboratory for the use of industries," says Lewis E. Soldan, president of Productive, "In screening problems is to get actual screening data. The need is not confined to new applications but a consolidation of information about present equipment is of vital importance. With business on the rise industries depending on screening equipment must have a place to turn where they can quickly get all the information and tests or analysis of their product. It is our purpose to conduct the research department for industries along educational lines in the development of better screening."

◆ E. H. LARKIN returns to the Bryant Paper Company, Kalamazoo, Mich., as vice president after an absence of about a year during which time he was vice president and sales manager of Wausau Paper Mills Company. He will again be in charge of the Chicago sales district of the Bryant Paper Company, making his headquarters, as formerly, at the company's Chicago office in the Daily News Building, Chicago, Illinois.

◆ Paper Making Through Eighteen Centuries

Dard Hunter, of Chillicothe, Ohio, has purchased for resale all of the remaining copies of his book, *Papermaking Through Eighteen Centuries*, from the estate of William Edwin Rudge.

Mr. Rudge, during his lifetime, was known widely as a publisher of unusual and special volumes. This book by Mr. Hunter, which was published by Mr. Rudge in 1930, is no exception.

The paper used for the book is of excellent grade and was made especially for the edition. The printing was done with great care in the Rudge process of aquatone. It is bound in tan buckram with red leather label stamped in gold. Page size, 6 inches by 9 inches.

The material contained in this volume of 358 pages, including 214 illustrations and folding plates, was gathered over a period of thirty years. To collect the data, drawings and photographs, the author traveled more than 200,000 miles in all parts of the world.

No student of papermaking, or any one interested in the industry and its history, should be without this book. The original price was $17.50 per copy, but Mr. Hunter is offering the remaining volumes at a price of only $4.75 per copy postpaid to any part of the world.

◆ LINK-BELT COMPANY, Chicago, announces the appointment of P. B. Engstrom as the company's authorized distributor in Los Angeles and Southern California territory. He is making his headquarters at the Link-Belt office in Los Angeles, 361-369 South Anderson Street. Another personnel change is the transfer of B. Howard MacNeal from Memphis, Tenn., to the Link-Belt office in Philadelphia, 2045 W. Hunting Park Avenue.

◆ Superintendents Go to Springfield in 1937

Announcement has been made that the annual meeting of the American Pulp and Paper Mill Superintendents Association will be held in Springfield, Mass., June 23, 24 and 25, 1937.

W. Gordon Booth, of Gair Thames Containers, Inc., New London, Conn., is General Chairman of the National Convention and he is already organizing plans for the program and entertainment features.

◆ IPI New Color Guide

A new "Color Guide" containing a range of the colors most useful to paper manufacturers along with information on proper color selection and application is being distributed this month by The International Printing Ink Corporation.

T. M. Cleland, prominent New York illustrator, designed a special cover for the Color Guide.

IPI's new Guide, which supersedes the Color Pageant, is not an ink specimen book. According to its producers, it is designed to be a practical reference chart that can be used in selecting colors and appropriate color application. Colors are not labeled with trade names or formula number. Instead, three-dimensional color designations, numerically classified, appear beneath each color shown.

A discussion of color relationships and an explanation of the numerical system for designating color is given on a page of information which is included in the Color Guide. Also on this page are directions for getting the best use from the Guide, a description of spectrophotometric color analysis, and data on ink selection and matching. The guide has a stiff back, with tabs for hanging on the wall.

◆ J. H. Allen Made Vice President Union Bag

Union Bag & Paper Corporation, New York City, announced November 23 that James H. Allen had been elected vice president. At the same time it was announced that Edward J. Noble and been elected a member of the board of directors to succeed Charles R. McMillen, recently resigned.

Mr. Allen joined the corporation in November, 1934, and has been closely associated with the company's activities in the South, including the location, financing, and erection of the new Savannah mill, of which he is in general charge.

◆ Felt Company to Operate Avery Paper Mill

The plant of the Avery Paper Corporation, Avery, Ohio, which has been closed for several years, is now being reconditioned by the Weaver-Wall Company, Cleveland, Ohio, large manufacturer of asphalt shingles and roofing felts.

The felts produced at the rehabilitated plant will be shipped to the Weaver-Wall Company's saturating plant at Cleveland to be converted into roofing felts.

It is claimed that this will be one of the finest mills of its kind in the United States. Local help will be employed as far as possible. J. P. Furlong, who has had wide experience in the production of roofing and other felts both in United States and Canadian mills, is superintendent.

◆ New Mill Rumored for Gray's Harbor

A local press item quotes the following statement as having been made by the Hon. Clarence Martin, Governor of the State of Washington during a radio address October 13. "Eastern capital and new industries are looking toward Washington. For instance, just a few days ago representatives of a mid-western concern visited at Olympia, discussed taxes and the policy of a sustained yield of timber, found the assurance satisfactory, and declared their intention to build a $5,000,000 pulp and paper plant on Gray's Harbor."

Paper House Has Paper Furniture

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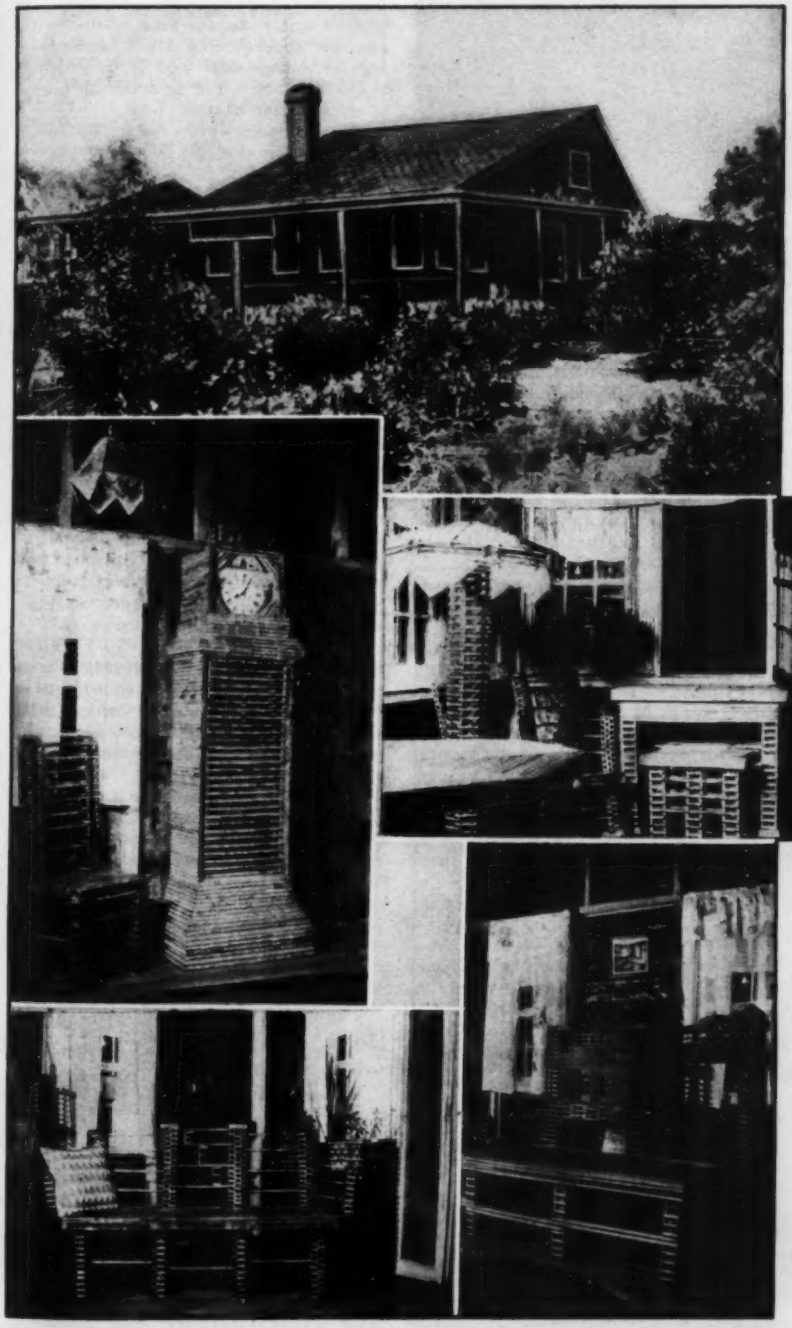

This house, made of paper, looks much the same as any type of small bungalow. The unique furniture, shown in the interior views, is all made of paper

THIS unique house and nearly all its furniture and furnishings are made almost entirely from more than 100,000 newspapers, collected through the years from all over the world. The only parts of the house not made of paper are the wooden frame, the asbestos shingled roof, and the brick fireplace and chimney. The walls are fashioned from 215 thicknesses of folded newspapers which are treated and shellacked with a secret preparation that renders them absolutely waterproof and almost as fireproof as asbestos. This house was built some time ago at Pigeon Cove, Massachusetts, by Ellis F. Stenman, who lives in it at present. It rests on a high ledge near the ocean and the continuous bombardment by North Atlantic winter storms has caused no deterioration to date. The secret preparation used to treat the newspapers has the consistency of glue and hardens with a transparent gloss-like finish that is extremely durable.

On the inner walls, the papers are so arranged that accounts of many famous events may be read, and the pictures of many noted people can be seen. The paper furniture and furnishings were made from time to time after the completion of the house and additions are still being made. The newspapers were formed into very tightly packed rolls of different sizes for the construction of the furniture. Among the notable pieces are a writing desk and chair made exclusively of accounts of the Lindbergh flight, and a radio cabinet made of the Hoover 1928 campaign and election. A grandfather clock consists of papers printed in each of the capital cities of the various states, and a piano accounts for Admiral Byrd's adventures. A cot has the entire newspaper history of the World War, and a fireplace is veneered exclusively with rotogravure sections of Boston and New York City papers. The owner sleeps in a paper bed under paper blankets and there are lamps, stools, chairs, tables, etc., all telling stories of their own.

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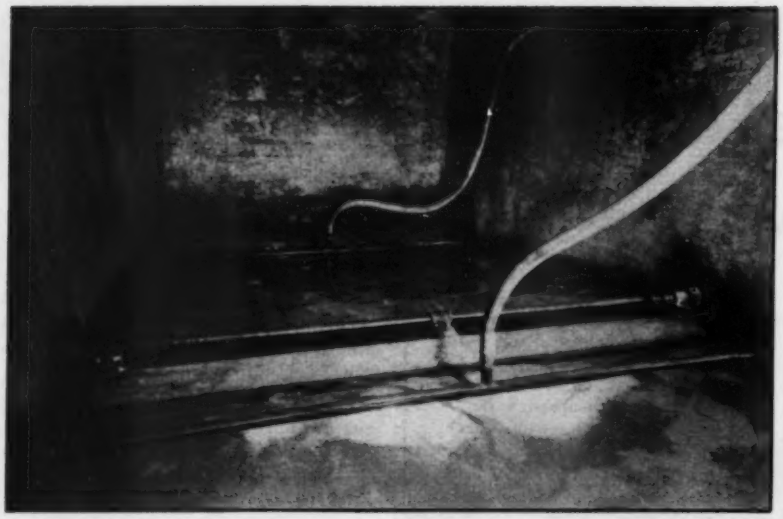


◆ Suction Removal of Stock From Sedimentation Tanks

A suction mechanism for removing stock from the bottom of a rectangular white water sedimentation tank has been worked out jointly by the Chain Belt Company, Milwaukee, Wisconsin and a paper mill in the Appleton, Wisconsin district.

In the initial installation, one in which the white water from five paper machines is treated and settled in a single tank, the mechanism includes two nozzles, two roller racks, a sprocket drive arrangement and limit switch mechanism for the racks, one hose for each of the two nozzles, and a suction pump. The two nozzles, each long enough to cover the entire width of the tank are located parallel to one another on the tank bottom at a distance of about half the tank length between them. They are connected at their extremities to the two roller racks which in turn are engaged by sprocket wheels, one for each rack. The sprocket wheels are attached to a shaft that passes through one side of the tank through a stuffing box. Connection is made between each nozzle and the suction pump through its respective nozzle hose.

Each of the two suction nozzles travels from its end of the tank to the center. Assuming that one nozzle is at the end of the tank while the other is at the center, the rotation of the shaft propels the nozzles so that one travels from one end of the tank toward the center and the other from the center toward the opposite end. Movement is continued for the full distance of travel when the limit switch mechanism causes the direction of travel to be reversed and the nozzles again cover the entire tank bottom but in the opposite direction.

The settled stock, containing about 60 per cent clay and 40 per cent wood fibers (dry basis), is removed through the nozzles, nozzle hose, and suction pump at a consistency of from 160 to 200 pounds of dry solids per 1000 gallons. The clarified white water is piped to a filtered water storage tank while the reclaimed concentrated stock goes to a special storage tank and from which it is drawn as required to make up a part of each beater charge.

The original white water, having a concentration of about 13 lb. of dry stock per 1000 gallons, is treated continuously with an alum solution to maintain a pH that gives optimum settling prior to entering the sedimentation tank. A clarified water containing one pound or less of dry solids per 1000 gallons then is obtained through sedimentation. This water is satisfactory for use in shower pipes and for any other plant use for filtered water except boiler feed.

An estimated saving of $100 per day is made for the initial installation.

A second installation is now being made in the same paper mill as the first. This installation will receive white water from one paper machine and the reclaimed stock from this water will go directly to a fan pump for recirculation with the sheet furnish. Another mill also is making an installation for use in connection with a single paper machine.

◆ Circular Knife Grinder

A new circular knife grinder, designated as No. CC1 and No. CC2, has been announced by Samuel C. Rogers & Company, 191-205 Dutton Ave., Buffalo, N. Y. This grinder is designed for the grinding of single or double bevel knives or discs, the No. CC1 for knives to 14 inches

in diameter, and the No. CC2 for knives to 20 inches in diameter.

The machine is entirely self-contained with control switches conveniently mounted on the base. Its grinding wheel with suitable guard is mounted directly on the arbor of a ¼ hp. ball bearing motor. A 6 in. by ½ in. wheel is standard.

The entire grinding wheel and motor assembly has a double adjustable slide mounting. This arrangement permits either single or double bevel grinding, while a swivel adjustment permits the grinding of bevels either way on the work. A positive graduated index makes possible the control of setting for any degree of bevel.

The grinding head operates in and out by hand through a screw and hand wheel.

Adjustable steel gibs take up the wear.

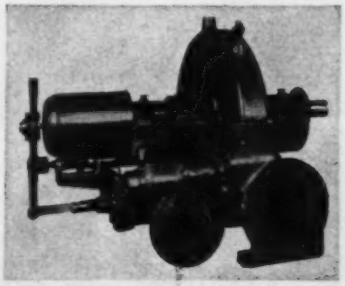
The knife being ground is revolved by a separate motor drive through V-belt connection. It is mounted on an adjustable arbor which provides for the mounting of solid circular knives or of knives made in two sections. Flanges are used to support a thin knife of small diameter.

A wet grinding attachment and or an 8 inch grinding wheel may be furnished on special order.

◆ Steam Turbine for Mechanical Drives

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has brought out a new line of Type "C" turbines. These turbines are of the impulse type and are built in capacities ranging approximately from 5 to 500 hp. at turbine speeds of 1000 to 5000 r.p.m. They may be operated either as condensing or non-condensing units with rotation in either direction and are suitable for use with steam pressure up to 650 lb. gauge and for total temperatures up to 750 deg. Fahr.

All pipe connections for this line of turbines are made to the base of the individual unit so that cover may be removed readily for inspection of internal



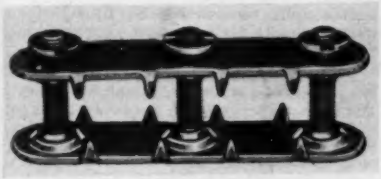
parts. The base is arranged so that the exhaust opening may be located on either side to best suit individual conditions. The rotor consists of a steel disc, shrunk and keyed on a steel shaft, and carrying two rows of corrosion and erosion resistant stainless steel blades. A sensitive centrifugal weight governor to control turbine speed is mounted on the

end of the rotor shaft and connected through a lever to steam admission valve. Bronze alloy steel steam admission nozzles are bolted to steam chest, which, in turn, is bolted to the casing base.

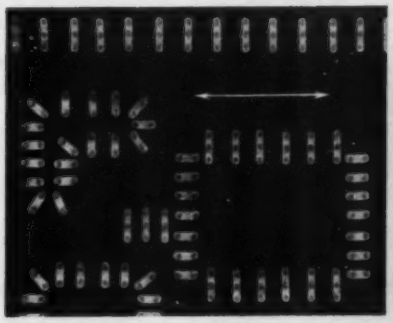
This line of turbines is stated by the manufacturer to be particularly adapted to driving pumps, forced and induced draft fans, compressors, Jordans, beaters, line shafts and similar apparatus, either direct connected or through gear or belt drive.

◆ Rip Plate for Conveyor Belt

Flexible Steel Lacing Company, 4675 Lexington St., Chicago, has announced the development of a rip plate for re-



pairing rips or holes in conveyor belting. The accompanying two illustrations show the construction details of the plate as well as its use in rehabilitating a belt. The latter illustration shows the completed job in the repairing of a rip as well as several holes. Note that the patches are cut rectangular in shape or in the shape of an "L" and that the corners of the two smaller holes and patches are rounded. This practice is recommended since it leaves space for



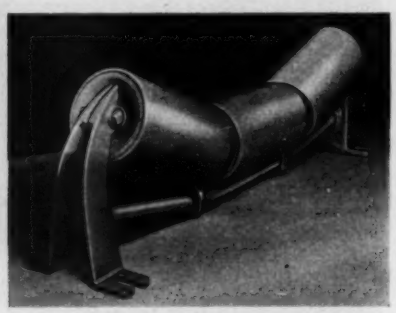
a diagonal fastener on each corner. In attaching the patch, the fasteners are spaced closely on the width of a belt and a space of about three inches is left between them on the length.

The plate, which is known as the Flexco rip plate, has already demonstrated its practicality. Thousands of feet of conveyor belting have been repaired with it.

Further details regarding the plate will be furnished by the manufacturer upon request.

◆ Truss Frame Belt Conveyor Carrier

A new "truss-frame," sealed ball bearing, belt conveyor carrier, has been announced by Stephens-Adamson Mfg. Co.,



Aurora, Illinois. This carrier is of the 3-roll in line design with outer rollers inclined to give the belt a 20 deg. trough. The whole roller assembly is tilted to center the belt without guide rollers. All

(Concluded on page 760)

◆ ADKA Saveall

A white water saveall, known as the ADKA, and invented by Adolf Karlstrom, a Swedish engineer, is now being manufactured and sold in the United States by the Dorr Company, Inc., Engineers, 570 Lexington Ave., New York, N. Y.

This saveall first aerates the white water, later reducing the air pressure over its surface, and then through a suction pipe removes the fiber and filler, which, buoyed up by air bubbles, are caused to float.

The accompanying sectional view of the saveall illustrates the method of operation.

White water is delivered to the unit through pipe A. Chemicals used for flocculation are introduced at E. Air is induced into the white water through pipe F and the water discharged into conditioning box H.

Compartments H and J of the box are provided to allow the undissolved air to escape and also to condition and flocculate the relatively short fibers and filler. On leaving the de-aerating duct J, the conditioned white water travels up through tube K into the evacuated tank L.

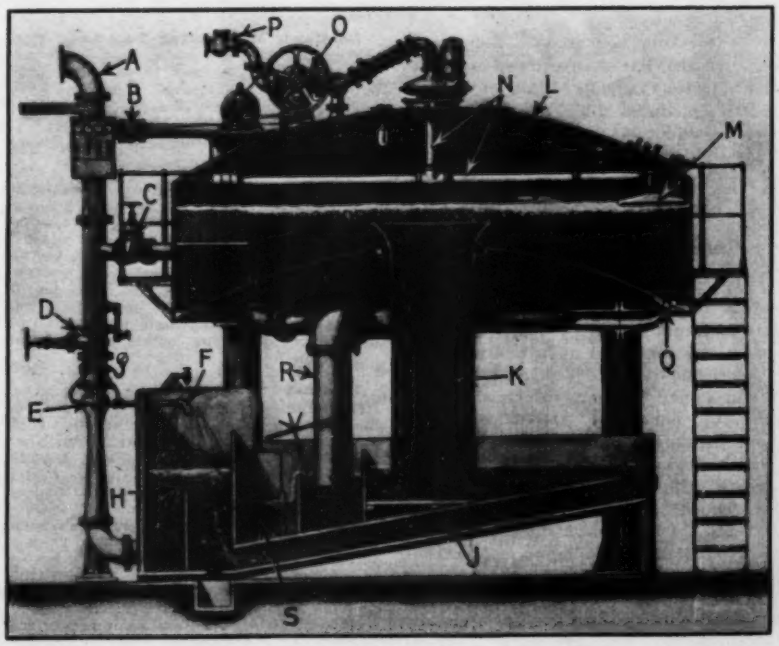
Due to the constantly decreasing pressure on the water rising in the draft tube K, minute air bubbles are released and become attached to the flocculated fiber and filler. Upon discharge from the draft tube into the tank L, the water is conditioned so that the paper stock rises to the surface where it is removed by the suction nozzle M, as it sweeps along the surface in a circular path at the inner periphery of the tank.

Nozzle M is attached to a section of piping N connected with the wet vacuum pump O, which discharges the pulp directly to the paper machine. In addition to removing the constant volume of recovered stock, the vacuum pump also removes sufficient air to maintain a constant vacuum and water level in the tank.

The clarified water is discharged through four outlets, as at Q, which lead into a central discharge pipe R. Upon discharging from this pipe it can be reused through the connection S.

There are nine standard sizes of the saveall. These sizes range from 8 ft. in diameter to 21 ft. 6 in. Corresponding capacities range from 100 to 1100 gallons per minute.

The manufacturer claims that the use of this saveall permits color and furnish changes to be made at will without emptying and cleaning the saveall; that sweetening stock to promote clarification is unnecessary; and that overall stock recoveries range up to 95-99 per cent, depending upon stock content of the white water.



(Continued from page 759)

parts are made of steel and malleable iron. The rollers are built of 5 in. diameter steel tubing with ends smoothly rounded over pressed steel end plates. Roller ends are recessed to house the bearings and allow rollers to be closely spaced. Renewable, cartridge type ball-bearings are used throughout. Each bearing has been packed with grease and sealed at the factory. A tension rod carries the load instead of depending upon the stiffness of a heavy cross member for support. This frame is built in sizes for 18 in. to 48 in. wide belts.

◆ CHAIN BELT COMPANY, Milwaukee, Wis., announces the election of John T. Brown, former works manager, as a vice president of the company. Mr. Brown has been associated with Chain Belt since his graduation from Yale in 1925.

◆ Plane Carries Heavy Shipment to British Honduras

It's not often that heavy materials are shipped by airplane, but here's the story of an order received recently by The Armco International Coroporation, a subsidiary of The American Rolling Mill Company, Middletown, Ohio.

Specifications called for Armco Ingot Iron plates of such a size as to permit its passage through a 3 ft by 5½ ft. hatch for stowage in an airplane cabin. The purchase was made by American Smelting and Refining Company for its subsidiary, the New York and Honduras Rosario Mining Company.

The plates will be used for a penstock to be erected deep in the wilds of the British Honduras. An airplane provides the only suitable method of transportation to the site. The penstock will be used to regulate flow of water in a section of the country far from civilization's outposts.

◆ THE BOARD of Directors of General Refractories Company, Philadelphia, recently appointed Lionel Y. Greene as vice president in charge of operations; Russel P. Heuer, vice president in charge of research, and Drew M. Thorpe, vice president in charge of sales.

◆ German Institute Honors C. B. Thorne

The Technische Hocheschule (Institute of Engineering) of Darmstadt, Germany, has conferred upon C. B. Thorne, vice-president of the Canadian International Paper Company of Hawkesbury, Ont., the degree of "Doctor Ingenieur honoris causa" on account of his research work in the pulp and paper industry. The diploma was presented to Dr. Thorne November 1 by L. Kempff, German Consul-General for Canada and Newfoundland, in his home, in Montreal, in the presence of Mrs. Thorne and of a number of personal friends of Dr. Thorne.

◆ New Catalogues and Publications

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—No. 1154A is a new revised bulletin covering the construction and numerous uses of this company's modern coupled and engine type synchronous motors. It also deals with the increasing usage of this type of motor. The material is well presented and illustrated.

Aluminum Industries, Inc., Cincinnati, Ohio—In an attractive catalogue of 45 pages and cover, this company has graphically described applications for its Permite Ready Mixed Aluminum Paint. This catalogue outlines the development in aluminum paint and the requirements of different forms of maintenance painting. The proper type of Permite to use for each purpose is described and illustrated. There is also an interesting chart showing the types and physical properties of Permite for different applications, such as the oil length, viscosity, drying time, baking time, percentage of thinning required, etc. The book is attractively printed in black on coated paper, with silver trim. Copies may be had by sending requests on company letterhead.

American Allsafe Co., Inc., Buffalo, N. Y.—A circular describes the Allsafe Life Line Grab, which is recommended for use with all safety belts. Another circular features Hy-Tensil Safety Belts and will be of interest to all safety directors.

Black-Clawson Co., Hamilton, Ohio—A folder entitled "The Right Move" is devoted to B-C Uniform Pressure Doctors. The text is well illustrated.

Bloomfield Chemical Co., Bloomfield, N. J.—A 4-page folder entitled "Keep Boilers Efficient" has just been published by this company. This folder treats concisely the subjects of water, scale, prevention of scale and corrosion, and explains how to keep boilers clean scientifically. Copies on request.

Coe Manufacturing Co., Painesville, Ohio—The performance of the Coe Drainator is set forth in Catalogue No. 903. This is an attractive piece of offset work in color. The Drainator's performance in relation to various condensate problems is given for different industries; one page is devoted to the paper industry. There are many illustrations and tables of data.

Dominion Engineering Co., Ltd., Montreal, Canada—Dominion Ball Mills are described in a booklet 126-A. The component parts are treated under sectional headings, and there are some fine illustrations. The text is also amplified with tables of data and dimensions.

Elgin Softener Corp., Elgin, Ill.—"The Inside Story of Boiler Water Conditioning" is given in a new 16-page bulletin just published. This bulletin covers the subject with a clear, non-technical discussion of all the various methods. It shows the importance of selecting the right method to handle the conditioning of various waters and it emphasizes the necessity for a thorough understanding of the subject for efficient operation. Copies on request.

Flexrock Co., 800 N. Delaware Ave., Philadelphia, Pa.—How old floors may be made like new by the use of this company's product, Ruggedwear Resurfacer, is told in a folder just received. A guarantee trial offer is outlined in this folder, copies of which will be sent on request.

Foxboro Co., Foxboro, Mass.—"Valves for Air-Operated Controllers," a 28-page bulletin, provides a comprehensive review of controlled valves of both the throttling and quick-acting "open-and-shut" type, as well as modern controller accessories for extending the practical application of automatic control. There are pressure-temperature curves, as well as equations and new formulae. The booklet is well illustrated and attractive in appearance.

General Electric Co., Schenectady, N. Y.—A late folder is devoted to descriptive illustrations of the Type AE-1 Air Circuit Breakers for industrial and central station auxiliary service.

Productive Equipment Corp., 4600 S. Kedzie Ave., Chicago—The Research Department of this company has prepared a booklet giving "Data on Controlled Vibration and Screen Efficiency." The first section of the booklet is devoted to the history of screening, reviewing some of the primitive sorting devices. The subject is treated from an engineering standpoint and the booklet contains data and tables of valuable information. The application of the company's Selectro vibrating screen to screening operations is covered in a comprehensive and thorough manner. The material is very well presented and accompanied by illustrations, curves, small cartoons and typographical effects.

Republic Flow Meters Co., 2240 Diversey Parkway, Chicago—Republic CO_2 Data Book No. 403 is a recent piece of literature just received. It contains complete specifications covering the construction, principle of operation and application of Republic CO_2 Meters. The material is presented briefly and concisely and consists of informative data of value to everyone interested in obtaining efficient combustion. Copies on request.

BOOKS

Brown Instrument Co., Philadelphia, Pa.—The Brown Flow Meter Engineering Handbook has just been published. It covers every phase of flow meter engineering—principles, designs, applications and installation—and the data covers all types of fluid measuring equipment using the orifice. There is complete information on the following subjects: General Flow Meter Engineering; Orifice Design; Steam Flow Measurement; Water Flow Measurement; Liquid Flow Measurement; Air and Gas Flow Measurement. There are charts, photographs and sample problems, just like those encountered every day by power and processing engineers. It is a handsome volume of 164 pages, printed on coated paper and bound with Spanish grain leather. It is priced at $2.00 per copy.

The Story of News Print Paper—This book reproduces a series of advertisements which appeared under the same title in *Editor & Publisher* during 1936. These pages present much fundamental data relative to the newsprint industry. The data includes information on the history of the industry, on its economics, and on the technology of the processes involved in its manufacture.

In addition to this series of advertisements, totalling twenty-five in number, there is an excellent introductory chapter that describes the actual manufacture of newsprint. This chapter takes up such items as woods operations, transportation, barking, pulp making (grinding and cooking), paper making and building a mill.

The book is nicely illustrated and is bound in an attractive embossed paper cover.

The purpose behind the book was to furnish a source of authoritative information on this industry for the use of newspaper publishers; librarians; students in journalism; forestry and economics; school teachers and others. Nowhere in the book is there any mention of any individual or any company. It, however, was made possible through funds furnished by a few members of the Newsprint Service Bureau and it was through this Bureau, located at 342 Madison Avenue, New York, N. Y., that the book was published. Single copies are priced at one dollar each.

◆ National Paperboard Association

The annual meeting of the National Paperboard Association was held at the Waldorf-Astoria Hotel, New York City, Thursday, November 19. The sessions were well attended and figures reported at the meeting indicated that the production of paperboard of all kinds during the year 1936 (the figures for November and December estimated) will exceed the production of the previous year by approximately 13.4 per cent.

Sidney Frohman, who has served as the association's president for the past three years, gave his report on "Association Activities of the Past Year." This message was an excellent and exhaustive account of the activities of the association for 1936, and Mr. Frohman, as well as the other retiring officers were highly commended by the membership in fitting expressions of appreciation for their services.

New officers elected were: President, Henry D. Schmidt, Schmidt & Ault Paper Co., York, Pa.; vice president, S. M. Phelan, West Virginia Pulp and Paper Co., New York, N. Y.; executive manager, Frederick G. Becker, Chicago, Ill.; secretary and treasurer, H. S. Adler, Chicago, Ill.

◆ Evasions of Tariff Laws Increase

The improved paper market in the United States is resulting in a greatly increased effort of foreign paper mills to take advantage of American conditions, with the result that the attempted evasions of the Tariff laws are growing in number. According to Warren B. Bullock, Manager of the Import Committee of the American Paper Industry, new cases coming before the Customs officials or Customs Courts in the last month include the following:

Two problems involving lithographed writing paper in boxes. One shipment is of boxes containing 24 sheets of writing paper and envelopes, to be sold by the box. The other case involves boxes of 100 lithographed sheets and envelopes for sale individually as letter paper with envelopes. In each case the importers are claiming the merchandise dutiable as papeterie under the reciprocal trade agreement with France, dutiable at 30 per cent. Before this agreement the rate was 40 per cent.

Two importations of fine Japanese tissue at San Francisco were classified for duty at 6 cents per pound and 20 per cent, but the importers claim in Customs Court that the proper rate is 5 cents per pound and 15 per cent.

Imitation stained glass paper imported at Chicago was held by Customs officials to have been undervalued.

An importer of kraft wrapping paper at Los Angeles has appealed to the Customs Court against the value of $85.50 per ton f.o.b., Sweden on which duty was collected, claiming the proper dutiable value is the actual sale price of $60 per ton, c.i.f. Los Angeles.

One importation of marble paper classified for duty at 5 cents per pound and 15 per cent, claimed by importer to be dutiable at 4½ cents per pound and 10 per cent.

One importation of mending tape classified for duty at 5 cents per pound and 20 per cent, claimed by importer to be dutiable at 3 cents per pound and 15 per cent as greaseproof paper.

One importation of basic blue print paper classified for duty at 20 per cent claimed by importer to be dutiable at 5 per cent.

Five shipments of waxed paper candy wrappers classified for duty at 5 cents per pound and 20 per cent as manufactures of waxed paper, claimed by importer to be dutiable at 3 cents per pound and 15 per cent as waxed paper.

◆ Forestry College Observes 25th Year

The celebration of the 25th anniversary of the founding of the New York State College of Forestry at Syracuse University was observed November 19-21.

Twenty-five years ago the first class in forestry was held in the corner of Lyman Hall, one of the buildings of the liberal arts college on the Syracuse campus. The first classes were directed by the present dean of the Graduate School of the University, Dr. William L. Bray. A few months later Dr. Hugh P. Baker, the first dean of the college, now president of Massachusetts State, took charge of the institution and from that time it began a remarkable career of

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VARIABLE SPEED DRIVES
TANKS, VATS, ETC.
ENDLESS FELT WASHERS

RODNEY HUNT MACHINE CO.

38 Maple Street, Orange, Mass.

FOR SALE—Sheldon Electric Corporation's Colorscope. Used about two years. Address Box 248, THE PAPER INDUSTRY.

WANTED—Used roll grinder in first class condition for rolls up to 24 in. diameter and 127 in. face. Address Box 249, THE PAPER INDUSTRY.

WANTED—Used experimental cylinder or fourdrinier papermaking machine. Write giving full particulars as to width, condition of machine and price. Address Box 251, THE PAPER INDUSTRY.

It Pays to Read the Advertising in
THE PAPER INDUSTRY

THE PUSEY AND JONES CORPORATION

Established 1848

WILMINGTON, DELAWARE

The best test of the value of a Fourdrinier wire is on a paper machine. There can be no substitute for that experience.

Lindsay Fourdrinier Wires

successfully meet that test. We furnish them in *Longcrimp* and *Modified Longcrimp, Duo-Wear* and *Regular Weave.*

▾

The Lindsay Wire Weaving Co.
14025 Aspinwall Avenue Cleveland, Ohio

PULP MILL MACH'Y ◆ FINISHING ROOM MACH'Y ◆ FRICTION CLUTCHES ◆

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STICKLE AUTOMATIC STEAM CONTROLS
DRAINAGE SYSTEMS FOR DRYERS AND HEATING SYSTEMS
CONDENSATION ECONOMIZERS FOR HEATING AIR
DEAERATING FEED WATER HEATERS, REDUCING VALVES
STEAM TRAPS, OIL AND STEAM SEPARATORS

STICKLE STEAM SPECIALTIES COMPANY, 2217 VALLEY AVENUE, INDIANAPOLIS, IND.

development which has been furthered by the late Dean Franklin Moon and the present dean. Today there are two large modern buildings on the campus at Syracuse together with a well equipped pulp and paper laboratory and various other laboratories. The Roosevelt Wild Life Forest Experiment Station is part of the college. The large concrete State Ranger School building on the shores of Cranberry Lake in the Adirondacks and 20,000 acres of forest land used for experimental purposes advantageously located in various sections of the state give an idea of the wide scope of the public and professional education carried on by the institution.

The New York State College of Forestry is the largest and best equipped institution of its kind, according to informed foresters. To date it has approximately 1700 graduates including the Ranger School; a student body of 500 and a faculty of 45 members.

The banquet, November 19, was attended by men prominent in the professional field of forestry and education, the alumni and student body. The celebration closed November 21 with a meeting of the Alumni Association and a luncheon prior to the Colgate-Syracuse football game.

A history of the college written by members of the faculty has been published and was distributed at the banquet. Among the speakers on the various occasions were President Hugh P. Baker of Massachusetts State; Arno B. Cammerer, director of the United States National Parks; Conservation Commissioner Lithgow Osborne; Robert Moses, chairman of the New York State Council of Parks; Acting Chancellor William P. Graham of Syracuse University; Robert B. Goodman, chairman of Wisconsin Conservation Commission, and Dean Samuel N. Spring.

◆ Anniversary of Diesel Power

The 40th anniversary of the introduction of Diesel power into the United States was observed December 2 by a distinguished group of 300 leaders in business, industry and engineering, at a luncheon at the Waldorf Astoria, in New York, arranged by the Diesel Committee of the Exposition of Power and Mechanical Engineering.

Although millions of Diesel horsepower are installed in the country's railroads, mines, mills, ships, pumping stations and power houses and millions more employed in mobile units on engineering projects, on farms, in forests, and in countless other major industries, the projected luncheon is the first time public interest will have been focused on the progress and importance of the Diesel industry as a whole.

The development of Diesel as a prime motive power has paralleled that of the gasoline engine. The more spectacular application of the latter to automobiles has overshadowed the rapid advance in industrial importance of Diesel. Dr. Rudolf Diesel, Paris-born Bavarian, first recognized and made practical the principles of converting low grade, low volatile fuel into power by subjecting it to extreme high compression in an internal combustion engine. His memory was honored during the brief speaking schedule at the Waldorf luncheon.

◆ Leipzig Trade Fair

The next Leipzig Trade Fair will be held from February 28th to March 8th, inclusive, maintaining its unbroken record through seven centuries. The general pickup in world trade is shown by the 8,000 exhibits gathered from twenty-six of the leading producing countries, including the United States. It is expected that the business turnover of the Fair will better its average record of $400,000,000 exclusive of reorders. The approaching Fair will be the 1977th session of the historic exchange which is much the oldest as it is the largest world market.

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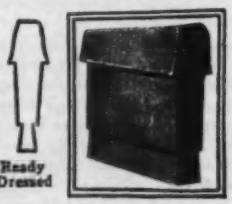

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July 1, 1936 to June 30, 1937

Cum. Scores as of October 31

27 Mills Have Perfect Record

PERFECT SCORES
Division 1—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A			
GROUP B	St. Croix Paper Co.	Woodland	Maine
	Continental Paper & Bag Corp.	York Haven	Pennsylvania
GROUP C	Container Corp. of America	Coated Board Div.	Chicago, Ill.
	Strathmore Paper Co.	West Springfield	Massachusetts
	Strathmore Paper Co.	Woronoco	Massachusetts
	Kimberly-Clark Corp.	Lakeview	Neenah, Wis.
	Container Corp. of America	Circleville	Ohio
GROUP D	Southern Extract Co.	Knoxville	Tennessee
	U. S. Gypsum Co.	Gypsum	Ohio
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	International Paper Co.	Webster	Orono, Maine
	Consolidated Water Power & Paper Co.	Stevens Point	Wisconsin Rapids, Wis.
	U. S. Gypsum Co.	No. Kansas City	Missouri
	Mead Paperboard Corp.	Nashville	Tennessee
	Hollingsworth & Whitney	Aroostook & Cobbossee	Gardiner, Maine
	Rogers Fibre Co., Inc.	Bar Mills	Maine
	International Paper Co.	Riley	Maine
	Central Fibre Products Co.	Vincennes	Indiana
	Central Fibre Products Co.	Mt. Carmel	Illinois
	Hollingsworth & Whitney Co.	Abenaquis	Madison, Maine
	Division II		
	Union Bag & Paper Corp.	Specialty	Hudson Falls, N. Y.
	Container Corp. of America	35th Street	Chicago, Ill.
	Union Bag & Paper Corp.	Grocers	Hudson Falls, N. Y.
	Container Corp. of America	Anderson	Indiana
	Container Corp. of America	Natick	Massachusetts
	Texas Corrugated Box Co., Inc.	Dallas	Texas
	Bemis Bros. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P- 10	1	1	1.646
	P-108	2	2	2.241
	P- 28	3	6	3.865
	P- 21	4	2	4.484
	P-121	5	3	5.059
	P- 27	6	6	5.600
	P- 44	7	4	6.306
	P- 13	8	4	6.460
	P- 18	9	6	7.391
	P-101	10	5	9.243
	P- 19	11	5	9.392
	P- 9	12	10	9.892
	P- 2	13	5	9.940
	P- 62	14	7	9.983
	P- 64	15	6	10.191
	P- 84	16	7	10.204
	P- 67	17	10	10.459
	P- 30	18	7	11.025
	P- 12	19	6	11.472
	P- 58	20	5	11.680
	P- 23	21	6	12.759
	P-107	22	6	14.942
	P- 1	23	15	15.322
	P- 69	24	9	15.737
	P- 95	25	10	20.746
	P- 73	26	18	21.851
	P- 87	27	14	21.935
	P- 83	28	16	23.341
	P-127	29	11	23.575
	P-102	30	17	24.323
	P-126	31	49	40.007
	P- 74	32	19	40.498
	P- 40	33	20	43.642
	P- 71	34	25	53.027
	P- 45	35	23	54.631
	P- 32	36	28	58.023
GROUP B	P- 11	3	1	2.789
	P- 60	4	1	2.947
	P- 72	5	1	3.670
	P- 51	6	1	3.852
	P- 25	7	2	5.010
	P- 68	8	2	5.761
	P- 3	9	2	6.553
	P-100	10	2	7.172
	P- 26	11	3	8.365
	P- 22	12	4	10.291
	P-112	13	4	13.287
	P- 59	14	4	15.452
	P- 70	15	6	15.843
	P-105	16	8	20.113
	P- 54	17	7	21.873
	P- 4	18	6	22.365
	P-104	19	6	22.962
	P- 76	20	6	25.055
	P-120	21	7	28.951
	P-124	22	9	30.135
	P-128	23	12	35.456
	P-123	24	12	35.793
	P- 82	25	17	44.333
	P- 16	26	16	47.721
	P-122	27	16	53.402
	P- 46	28	21	62.111
	P- 77	29	15	67.985

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP C	P- 55	6	1	4.441
	P- 52	7	1	5.432
	P- 56	8	1	5.564
	P- 75	9	1	5.739
	P- 14	10	1	7.222
	P- 94	11	1	7.809
	P- 61	12	3	15.340
	P- 29	13	4	18.942
	P- 37	14	4	19.197
	P- 34	15	3	19.458
	P- 42	16	3	19.563
	P-103	17	3	20.318
	P- 91	18	3	24.475
	P- 17	19	4	25.706
	P- 41	20	6	31.648
	P- 39	21	9	46.662
	P-111	22	8	48.221
	P- 50	23	7	48.615
	P- 47	24	11	57.479
	P- 33	25	12	64.845
	P-113	26	15	73.646
GROUP D	P-117	14	1	10.504
	P- 98	15	1	10.879
	P- 36	16	1	11.250
	P- 90	17	1	12.578
	P- 99	18	1	16.543
	P- 86	19	1	19.386
	P- 81	20	2	21.999
	P-116	21	3	25.007
	P- 8	22	3	25.750
	P- 53	23	3	35.895
	P-118	24	3	37.327
	P- 85	25	1	40.220
	P-106	26	4	44.419
	P- 6	27	5	44.550
	P- 65	28	3	46.457
	P-125	29	3	56.131
	P- 80	30	7	59.521
	P-129	31	10	162.005
	Division II			
	R- 6	8	1	2.231
	R- 2	9	2	6.435
	R- 1	10	3	17.177
	R-21	11	6	18.879
	R- 5	12	6	19.055
	R- 3	13	2	21.302
	R-18	14	3	22.791
	R-13	15	2	24.382
	R-14	16	2	56.591

No October report: Int. Paper Co., Orono, Me., P-74, P-75, P-76, P-77, P-83, P-120.
Withdrawn: P-115.

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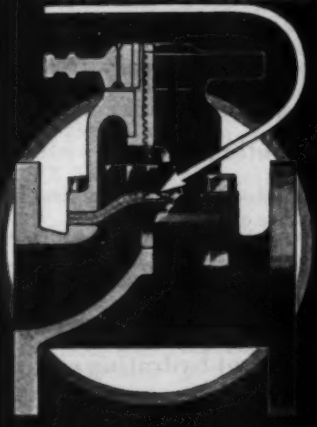

The number of seats this valve provides is practically unlimited because its diaphragm which is the opening and closing medium, does not take a fixed set every time the valve is shut off, but simply returns to its unflexed molded shape.

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POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Engineering Reticence

The personal quality of reticence is one which has long been associated with the engineering profession. "To do much and say little" has been almost an axiom with men of large responsibilities. Reticence is indeed a commendable trait at times, but, unfortunately, if carried to excess it reacts on the profession. An illustration of this tendency is the unwillingness of a large number of engineers to talk or write for publications. One has only to serve on any of the paper committees of the national societies or to be connected with the technical press to realize the significance of this fact. Only men who have had such opportunities for observation will realize how many excellent ideas have gone to oblivion unrecorded due to this characteristic trait. Every engineer should record his ideas and conclusions drawn from his experience, at engineering meetings and on any other appropriate occasion, from a sheer sense of duty to the industry of which he is a representative.

◆ IN ALTERNATING current work it is essential that the two or more wires of one circuit be installed in the same conduit to prevent inductive voltage drop and dangerous overheating of the conduit due to induced currents. Even when installing conductors for direct current circuits it is a good plan to include the two conductors in the same duct, so that if at any time it should become necessary to convert the system from the use of direct to alternating current, it may be done without extensive alterations.

◆ Buckling of Storage Battery Plates

Buckling or warping of plates is caused by excessive or unequal expansion and indicates the following: That the discharge has been carried too far, the rate too rapid, or that the current distribution over the plate was not uniform. Under the action of unequal expansion of the two sides of the plates strains will be set up, causing the plate to warp. If the buckling exists in only a moderate degree, the plates may sometimes be straightened by placing them between two boards and applying heavy pressure. Hammering is not to be recommended as the jarring tends to detach the active material. Badly buckled plates must be discarded. As a precautionary measure against this type of trouble, keep the discharge rate normal, do not carry the discharge too far, and keep the electrolyte circulating.

◆ TO HUNT out losses, it is necessary to divide plant operation into the separate steps involved, and study each step as to its effectiveness, both in itself and as a part of the whole operation. Three main divisions of plant operation seem to present themselves, naturally: Operation of the furnace, including the supplying of fuel and air, proper mixing of air and combustible gases, maintaining temperature in the combustion chamber, and securing best conditions for the transfer of heat from the gases to the water. Handling the water so as to have it in the best condition for boiler feeding, for absorbing the heat and for conversion into steam. And handling the steam so as to get from it the maximum of desired result.

◆ Fuel Oil Meters

In any installation where oil is used as fuel, means must be provided whereby the quantity used may be accurately determined. While this may be done by taking periodic tank measurements, it is probably much more satisfactory to install a suitable fuel oil meter.

There are a number of meters upon the market which differ more or less in design and construction, but most of which are reliable. The oil flowing through the meter actuates a piston the motion of which is transmitted to a counter or dial mechanism. These meters are usually placed in series with the line through which the oil is being delivered.

◆ KEEPING THE BATTERY temperature below 115-deg. Fahr. (46 deg. C.) during charge and maintaining proper height of electrolyte are the most important requirements for satisfactory operation of alkaline, or Edison, storage batteries. For highest efficiency the temperature of charge and discharge should take place between 75 deg. and 115 deg., the maximum being at 95 deg. Fahr. (35-deg. C.).

◆ A STANDARD or test gauge or better a gauge testing outfit should be found in every plant. If it is found on test that there is a practically constant difference between the readings, for instance the operating gauge may be read approximately 5 lb. high over the full range of readings, this may be corrected by removing the hand of the operating gauge and setting it back by the amount of difference. But if the difference in reading varies materially over the range of readings, the gauge needs the attention of an expert—or it may be that it has outlived its usefulness. In changing the pointer of a gauge care must be taken to lift it off the center spindle without giving it any twisting motion.

◆ Overhauling Feed Water Heaters

Heaters, like all other apparatus in a boiler plant, should be overhauled periodically. Particular attention should be given to the presence of oil and scale, to the tightness of joints and strength of parts. Owing to the low pressures carried in open heaters, it is usually not necessary to make any particular tests for strength. In the case of closed heaters, a hydraulic test for strength is probably the most serviceable, with such careful inspection of riveted joints and tubes as would ordinarily be given to a condenser or a boiler. In order that the streams of water in an open heater may be properly broken up, it is necessary that the pans be set as nearly perfectly level as possible. In connection with the periodical overhaul, the heater should be carefully leveled.

◆ SUPERHEATERS effect economy by reducing or even entirely eliminating cylinder condensation, which may run from 10 to 30, and even 40 per cent. In fact, superheated steam loses less heat to the cylinder than saturated steam does. It is more effective—

1. In slow-running than in fast-running engines.
2. In non-condensing than in condensing engines.
3. In non-compound than in compound engines.

◆ FALLING OFF in the evaporation per pound of coal, increasing stack temperatures and increasing difficulty in maintaining boiler output are indications that the boilers should be cleaned. The trouble is probably due to the presence of fly ash, soot and accumulations of heat-insulating substances inside the boiler. The engineer's observation of his equipment, taking into account his knowledge of the length of time since previous cleaning has taken place, will tell him whether or not more attention should be devoted to this phase of operating maintenance.

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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

IN THE PAPER INDUSTRY

◆ Deinking Old Paper

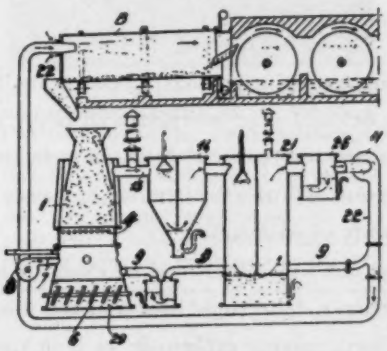
Use is made of water soluble sulphonic acids derived from organic compounds of high molecular weight. In general, the type formula of such a compound is $R.X.R'(Y.SO_3H)_n$, where R is a hydrocarbon residue, where X may be an oxygen or sulphur atom, or $-CO_2-$, NR^2CO, SO_2, NR^2, SO_2NR^2, or NR^2SO_2-, where R' is an alkylene or arylene residue, where Y is an O or S atom, and where R^2 is hydrogen or a hydrocarbon residue. In some compounds Y may be entirely lacking. The number n=1 or 2. Substances of this type or their neutralization products, are non-alkaline in aqueous solution, and they yield water soluble calcium salts which do not give precipitates with hard waters. They are excellent peptizing agents for dyestuffs and yield emulsions when the solutions are brought into contact with fats. As an example, old newspaper in 3 per cent suspension is treated in the beater with 0.4 per cent sodium metaphosphate and 0.5 per cent of the decyl ether of hydroxyethylsulphuric acid previously neutralized with NaOH. After 0.5 hour the liquid is drawn off, and the stock is washed. Paper made from this deinked stuff is adequately strong and sufficiently white.—British Patent No. 438403—Deutsche Hydrierwerke A. G. in Rosslau.

◆ Blue Stain in Groundwood

Blue stain formation in both wood and mechanical pulp have largely the same origin. The content of blue mold spores is usually quite high in the case of freshly prepared pulp. In the case of the main ones that lead to blue stain, there is a marked correlation between the number in the wood, and that found in the freshly prepared pulp. The air circulating in the mill is the greatest source of infection. The growth of these molds is dependent on the oxygen content, on temperature, and also on the nutrients in the groundwood slush. Saturation with water inhibits blue stain development, since this makes for exclusion of oxygen. Just what oxygen concentrations are most favorable for the growth of blue stain organisms is still undetermined. Stock which has been partially sterilized by heat often furnishes a better substrate than does completely unsterilized stock. With changes in the salt and carbohydrate content of the stuff, changes in blue stain formation are often noted. There are, therefore, marked differences between driven logs, and freshly felled wood when used as raw materials in mechanical pulp formation. Other microorganisms in the slush often influence blue stain markedly, and may cause inhibition of blue stain development. These blue stain antagonists, if they predominate, may be used industrially in prevention of the pulp bluing, and the author suggests that they may be added to the original wood. (The abstract, however, does not give the effect on pulp strength resulting from their addition.) E. Melin: Svensk Pappers tidn. 39, 89 (1936), through Papierfabr. (abstracts) 34, 229 (1936).

◆ Recovery of Sulphite and Sulphate Wastes

The solid matter is fed continuously through a generator (1), which is provided with a grate comprising a series of water-cooled tubes (4), placed above a dissolver (29). Useful combustible gases are generated in (1) from the organic matter left in the wastes. Above the surface of the liquid in (29) there are a number of conduits. For example, (7) is connected with a blast (8) supplying



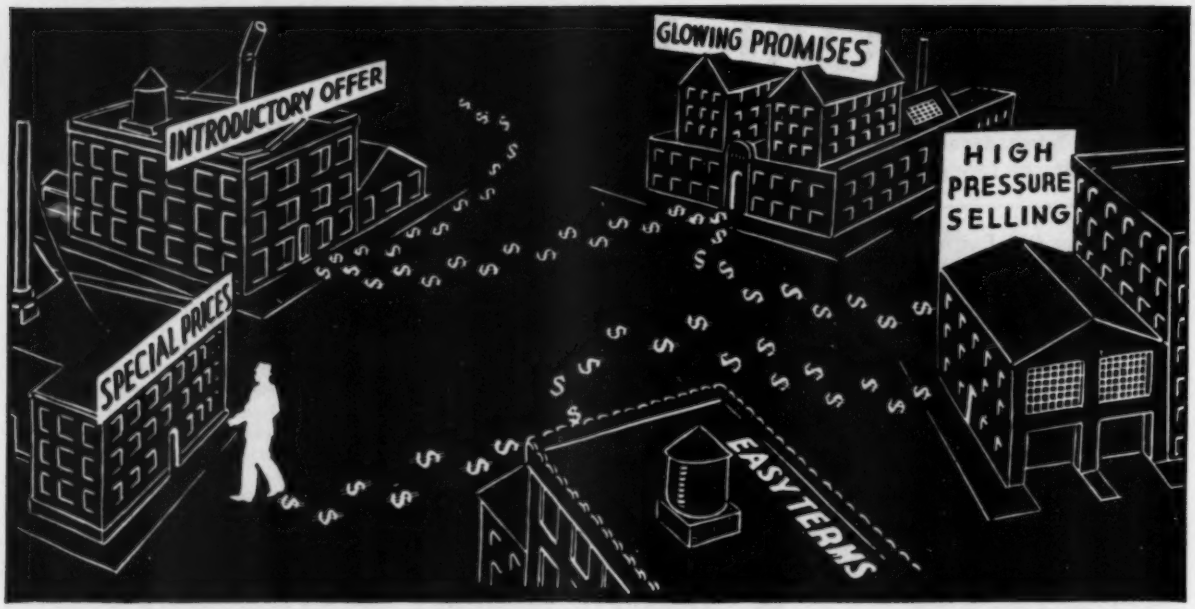
fresh air, and pipe line (9) leads to a blast (11) supplying generator gas. The latter is fed from (1) through (13) into the scrubbers (14), (21) and (26), through pipe lines (22), which is connected with arrangement (B) that serves in burning the generator gases so that their heat of combustion may be utilized in drying fresh waste liquor. The inorganic residues from (1) drop in the form of slag into (29), where they are dissolved and removed from the dissolver by means of an endless screw arrangement(6). Bror Natanael Segerfelt in Cartiera di Tolmezzo (Italy). German patent Kl. 55b, No. 627,305.

◆ Bearings and Their Lubrication

The author covers, in some detail, problems connected with steam cylinder lubrication, crank chamber lubrication, circulating systems in paper machines, and circulating systems in steam turbines, in modern paper mills. Steam cylinder lubrication, when heavy-bodied oils are involved, is best carried out indirectly. Direct methods of introduction often fail to lubricate certain parts, while oil is wasted on others. In other words, excessive oil is used. The more efficient, indirect method feeds the oil into the steam line, through an atomizer operating in the very center of the steam flow. The oil entering the engine lubricates the valves and valve spindles, and forms a uniform coating on the walls of the cylinder. The piston rod is well lubricated and its gland-packing is oiled from within. This is more economical than external lubrication, since the oil enters the packing with, instead of against the pressure, and since the usual losses due to scraping off of oil from the rod by gland-packing are prevented. Mechanical lubricators and their requirements are discussed in some detail.

In the case of steam engines using force feed lubrication, the requirements are: (a) use of high grade straight mineral oil, which can be separated readily from water and impurities; (b) a clean system at the start of the operation; (c) prevention, as far as possible, of water and cylinder oil from entering the crank chamber; (d) proper drainage of sludge and water from the crank chamber. In some detail, the author takes up the disadvantages of excessive oil pressure, which produces excessive bleed-off from the bearings, and which finally leads to oxidation of the oil and sludge formation. Since the circulating systems of paper machines and steam turbines are similar, they are discussed together. This discussion includes the construction of the main oil tank, the oil piping and the impurities in the oil. Provided high grade turbine oil is used, water is generally of little consequence. Iron oxide produced by the corrosion due to water vapor or sweating, may become an active catalyst in the formation of sludge. Silica (the quantities of which are greatest when a turbine bed is used) is found in almost all oils. Hot oil removes small particles of moulding sand from castings (even when adequate precautions have been taken initially for the sand removal), and silica acts much as does iron oxide. The bronze gear wheels driving the main oil pump and governor are probably the main source of copper in oils. Zinc is usually absent, at least in objectionable amounts, provided high grade galvanized piping and oil tanks are used.

The care of the oil in circulation is of importance. Over-cooling gives rise to oil-water emulsions in the cooler tubes, thus seriously affecting the efficiency of the oil coolers, which may even become choked with deposits. Generally the best temperature in the main tank is about



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The purchaser of paper-making chemicals, like most others, is constantly beckoned toward new fields. To the inexperienced buyer, the grass on the other side of the fence always looks greener. A special price, an attractive introductory offer, some promises, and high-pressure selling will often lure him away from known satisfaction into troublesome and costly experimenting.

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A satisfactory solution of the paper mill's chemical problems does not lie solely in obtaining well-made chemicals at a price. Although PMC has built a reputation for products of the highest quality through long sustained performance, this alone does not account for its leadership. PMC representatives have been continuously studying the problems of your mill for many years. They know its peculiarities and its needs as no newcomer can. They will continue to keep in close touch, as a newcomer may not. The service of an organization geared so closely to paper-making is worth more than any temporary advantage. Such a service should never be relinquished lightly.

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PM-30

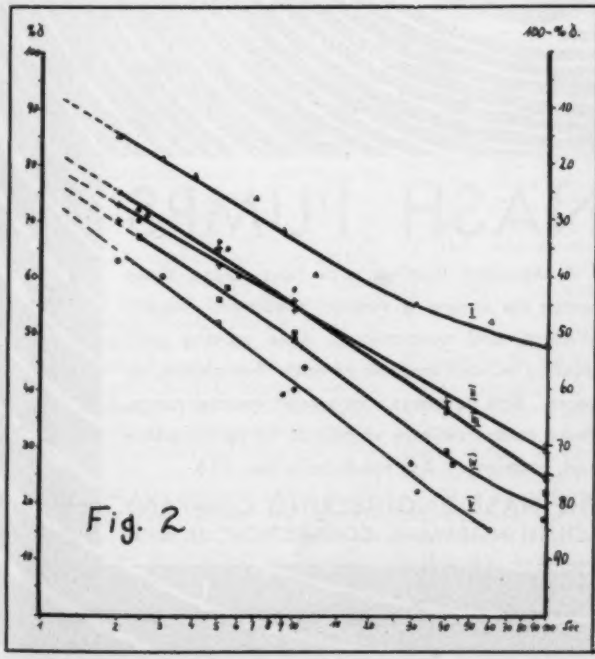
130 deg. F., while the temperature of the oil leaving the coolers should be about 90-100 deg. F. Under these conditions water and impurities are readily separated. While various types of oil filters may render excellent service, the centrifugal separator appears to be the most effective in purifying turbine oils. The author discusses the operation of such centrifuges with reference to the lengths of necessary periods of operation. These vary with varying conditions, and the author indicates the importance of keeping adequate records of the periods of operation, the quantities of water and impurities discharged, the length of operation prior to the cleaning of the bowl, and the quantity of deposit removed. The temperature of centrifuging must also be watched, as must the presence and concentration of acids in the water.

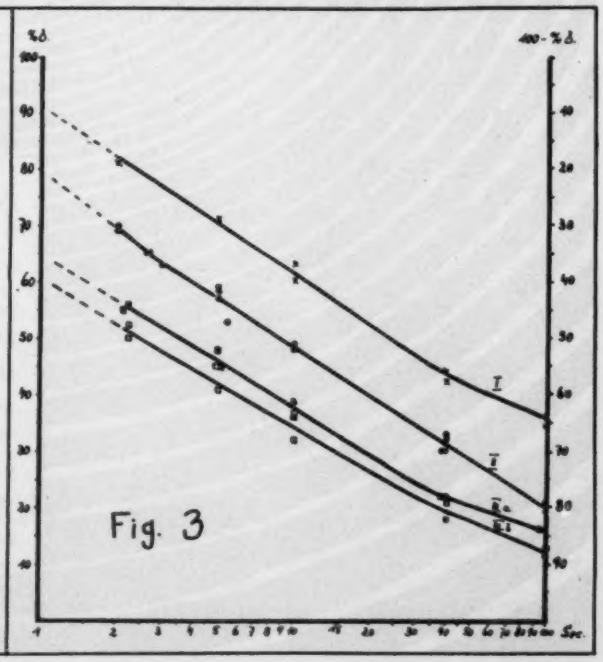
The life of turbine oil varies. Chemical examination is advised, and it becomes important to have a clear cut interpretation of such analytical data. With a new turbine, and using high grade oil, it may be expedient to run for about a month, remove the oil charge, clean the system, and then return the oil to the system after first passing it through the centrifuge. At least once a year, thereafter, charges should be removed, centrifuged (or otherwise purified), and then returned to the cleaned system together with new oil to compensate for losses previously sustained. However, large quantities of new oil should not be added to used oil, since sludge formation often results. While no dogmatic statement can be made, the life of a high grade turbine oil may reach 40 thousand working hours, under very favorable conditions. The following are symptomatic of the effects of service: (a) darkening of color, (b) increase in density, (c) increase in viscosity, (d) loss in separating values, (e) formation of deposits, (f) increase in acidity. Of these, the first three are not necessarily detrimental. The acidity seems to be caused by the oxidation of hydrocarbons in the

◆ Photometric Determination of Sizing

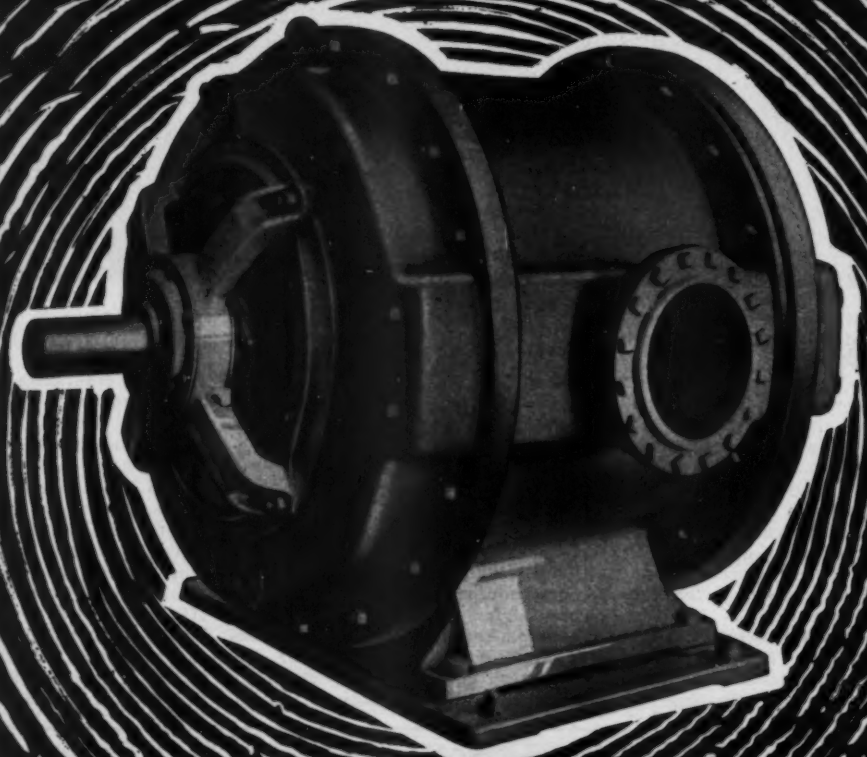
The test paper is cut into strips 4 cm. x 10 cm. These are laid upon a suitable dye solution (e. g., methylene-blue) contained in a clock glass (8-10 cm. diam.) in such a way that air bubbles do not form between the paper and the solution. Since the ends of the strip are kept free of dye, the test sample may be removed without difficulty at the expiration of definite time periods (measured from the instant of immersion, by a stop watch). The strip is then immediately rinsed with a stream of water until the washings are colorless. Care is taken not to train the water directly on the dyed portion of the paper. This prevents mechanical removal of the dye. Several strips are kept in contact with the dye for 2, 5, 10, 40 and 100 seconds respectively, and duplicate runs are made. After the rinsing process, the strip is dried in air. (Higher temperatures interfere with the color tone.) Figure 1 shows a series of two such tests. The strip samples at the extreme left (bearing the ink marks) are untreated. A large number of such experiments show that dye retention rises with increasing periods of contact between solution and paper and that the more poorly the paper is sized the more deeply it becomes colored. The differences in coloration, which are often not obvious to

the naked eye, may be measured photometrically in a dark room. The Zeiss Pulfrich photometer (with accessories for determining gloss) is used, and the colored strip is compared with an untreated paper strip, so that both samples are equally illuminated by the photometer lamp. The photometric reading gives the brightness of the colored strip directly (% D) expressed in terms of percentage of the uncolored sample. So that the original color of the paper is no longer a factor, light filters are used. After insertion of the samples, the instrument is adjusted so that both halves of the field appear of equal brightness to the observer, and the % D is read directly. The loss in brightness due to the absorbed dye is then 100 minus % D. Figure 2 gives a series of graphs in which % D is plotted against log. T (in seconds), showing differences in the use of various colorants (I being a commercial ink; II the so-called Pelican ink #4001; and III, IV and V, methylene blue solutions 0.125 g/L, 0.250 g/L and 1.0 g/L respectively). In Figure 3 are shown the effects of coloring various papers with 0.250 g/L of methylene blue. Here I is a water resistant wrapping paper sized with bitumen-wax emulsion; II is a typewriting paper; IIIa is a yellow wrapping paper tested on the rough side and IIIb is the same paper tested on the smooth side. Theodor Hennig. Papierfabr. 34, No. 22 (Tech. Teil.) 169-174 (1936).





Centralized Paper Mill Economy



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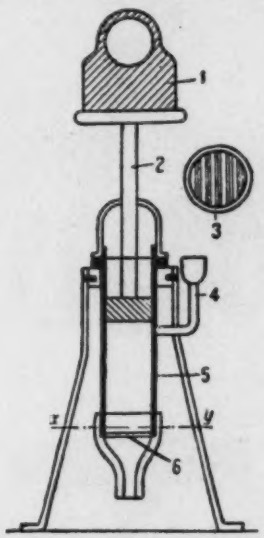
petroleum. This is influenced by the following factors: air, temperature, water, boiler salts, ferric oxide and other impurities, time of service. The degree of oxidation of an oil is correlated with acidity, the determination of which by titration is briefly discussed. To determine the stage at which an oil is no longer suitable for use, it is important to determine the rate of acidity increase, and also the rate of decrease of separating qualities. The limitations of such determinations are outlined. H. J. Nicholson: The Paper-Maker and British Paper Trade J., 92 (T. S.) 141-4; 153 (1936).

◆ Beryllium Perchlorate as Cellulose Solvent

Cellulose itself is insoluble in sodium, calcium, magnesium, strontium and zinc perchlorates, but is quite soluble at room temperature in basic beryllium perchlorate. Cellulose also dissolves in mixtures of beryllium perchlorate and the basic salt, but in neither one of the pure components. In these solutions (which are always acid) the cellulose suffers degradation, as shown by increasing copper number, decrease in viscosity, and decreasing ease of flocculation on addition of water. Cellulose, regenerated from its beryllium solutions, evidently retains little of the salt (ash 0.3%). The solubility of cellulose in the perchlorate is not dependent on the acidity of the peptizing agent. In fact, the maximum solubility is found at a point below the maximum acidity of the solvent. The beryllium-cellulose solutions give sharp readings in the polariscope, thus differing from Schweizer solutions. The original paper gives some of the optical rotations of 2 cellulose samples, which are all positive. Cellulose acetate, which is soluble in acetone, is also soluble, at room temperature, in saturated aqueous solutions of calcium, magnesium, copper and zinc perchlorate, and in warm solutions of silver and basic lead perchlorate. The dispersion of 9.3 grams of the acetate in 10 cc. of a magnesium perchlorate solution gives a solid, elastic mass, which becomes fluid at 45 deg. Cautious addition of water causes no flocculation, but increases the mobility of the sol, the maximum of which is reached when 2 per cent of cellulose acetate is present in 100 cc. of solution containing 44 grams of $Mg(ClO_4)_2$. Evidently the peptizing agent does not alter the cellulose acetate chemically. If a large excess of water is added, flocks of highly porous material are precipitated. Sheets made of this flocculent acetate are good ultrafilters. The solubility of an acetate in the other perchlorates, depends on its method of preparation. The pure cellulose triacetate can be dissolved only indirectly in a perchlorate solution. For example, it may be dissolved in methyl formate, and this solution added to the $Mg(ClO_4)_2$, from which the methyl formate is driven off by evaporation. Such cellulose derivatives as the trinitrate, dibutyrate, etc., are entirely insoluble. A. Dobry: Bull. soc. chim. (France) [5], 3, 312 (1936).

◆ Consistency Tester for Beater Stock

The Klopoff system is described, and the instrument, shown in its essentials in the figure, is valuable because of its simplicity and the fact that it can be constructed readily in the average machine shop. It consists essentially of a brass cylinder (5) open at either end, within which moves a plunger that can be loaded by weight (1) of 60 kilograms on the platform surmounting plunger shaft (2). A wire disc (6) and a grid (3) are attached to the bottom of (5) by use of a screwed-on socket. These permit the drainage of water. One liter of the stock suspension is poured through (4) into (5). Plunger (2) is then loaded



with (1) and kept under the pressure caused by these 60 kilograms for exactly 5 minutes. Subsequently the effluent socket is unscrewed, and the cylinder contents are removed. Some 100-120 tests are made to determine the drainage power of the apparatus. The consistency of a sample may then be calculated by using the formula K equals P(100-p)/1000, where K is equal to the consistency in grams of stock per liter; p equals the moisture which characterizes the compressing power of the apparatus for a given stock; P is the weight of the pulp cake. The accuracy of the consistency determination is 0.1-0.2 per cent Zellstoff u Papier, August, 1936; through Paper-maker and British P. Tr. J. (T. S.) 92, 131 (1936).

◆ Resin Acids as Fish Poisons

The investigation was carried out as a result of the high mortality of fish in a stream near a Swedish sulphate mill. Resin acids, whether they be isolated directly from coniferous woods or obtained as by-products from sulphate pulp manufacture, are lethal fish poisons. In this case of sulphate mill effluvia, the action was found to be lethal when the concentration of resin acids exceeded 2 milligrams per liter. However, fishes lived normally for at least 10 days in more dilute solutions, even though these were quite odoriferous, and despite the addition at intervals of freshly supplied condensates from the digester gases. Positive results were obtained when the bodies of dead (and dying) fish were examined for resin acids. Other components of the factory wastes, when free from these acids, appeared harmless. For example, mercaptans, mono-and polysulphides and terpenes failed to poison fish. N. Hagmann: Pappers Trävaru-tid. Finland, 18, 32 (1936),-through Papierfabr. 34, No. 41 (abstracts) 220 (1936).

◆ New Method for Wood-Drying

The report, given briefly in the Electrical Times, indicates that the U. S. S. R. Institute of Wood Working has used ultra-short radio waves which penetrate and dry the inner portions of the wood, and which appear to reduce the tension created during drying. Thus there is less cracking and spoilage, and the reduction in required time is considerable. For example, 2¾ hours appear to do the work which hitherto required 15 days. Engineer, Paper-maker and British Paper Trade J. (T. S.) 92, 146 (1936).

◆ Colorimetric Determination of Selenium in Sulphur

The method as outlined depends on the detection of selenium in concentrated sulphuric acid, by the use of codeine phosphate. One to ten grams of sulphur are oxidized to sulphuric acid by the action of fuming nitric acid. (The size of the sample used is contingent on the selenium content.) About 10 cc. of concentrated sulphuric acid are then added to the mixture, which is evaporated until fumes of SO_3 are given off. The solution is then cooled, water is added, and the evaporation repeated until all nitric acid has been expelled. It is essential that the solution be free from HNO_3, since even traces of the acid cause a brown coloration with the codeine salt. The sample is then poured into a 50 cc. measuring cylinder with a ground-in glass stopper, and the beaker is rinsed out with concentrated sulphuric acid, until the solution in the cylinder measures 20 cc. (assuming that 1 g. of sulphur was originally used). Ten to fifty milligrams of codeine phosphate are then added to the mixture in the cylinder, which is stoppered and well shaken. In the case of a high selenium content, the solution is immediately colored green, and this color veers over gradually into a blue. With low concentrations, the blue color develops instantaneously. The color of the sample is compared in a colorimeter with that of a standard solution prepared by treating selenium dioxide with concentrated H_2SO_4, and the selenium content in the standard is controlled by titration with standard iodine solutions. The chemical purity of all acids used must be determined carefully. H. Lindhe: I. V. A., No. 2, 42 (1936), through Papierfabr. (abstracts) 34, No. 42, 229-30 (1936).

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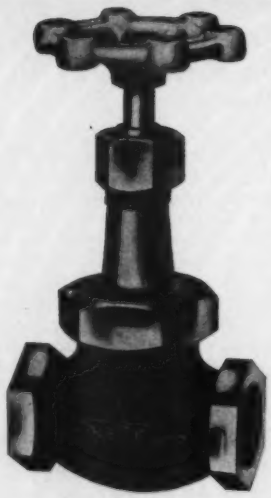

FIG. 102
BRONZE WHITE STAR GLOBE VALVE

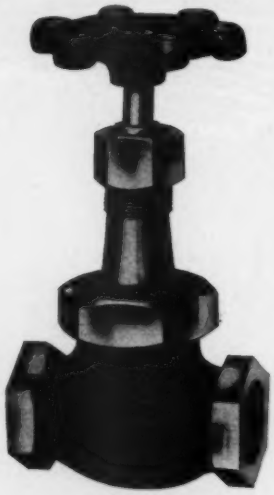

FIG. 150
BRONZE COMPOSITION DISC
GLOBE VALVE

FIG. 375
BRONZE WHITE STAR GATE VALVE

FIG. 1444
IRON BODY RISING
STEM GATE VALVE

FIG. 190
IRON BODY IRENEW GLOBE VALVE

FIG. 1431
IRON BODY NON-RISING
STEM GATE VALVE

POWELL VALVES

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PAPERMAKING PATENTS

IN THE UNITED STATES

Inquiries with reference to any of these patents should be addressed to James Atkins, Munsey Building, Washington, D. C.

Compiled by James Atkins, Registered Patent Attorney

20,123—Process and Apparatus for Digesting Fibrous Materials. Thomas L. Dunbar, Watertown, N. Y., assignor to Chemipulp Process Inc., Watertown, N. Y., a corporation of New York. Original No. 1,859,384, dated May 24, 1932, Serial No. 446,046, April 21, 1930. Application for re-issue May 23, 1934, Serial No. 727,205. 50 Claims. (Cl. 92—11). In the digestion of fibrous material, introducing acid liquor into a digester while discharging air to the atmosphere from the digester through an air vent until acid gas appears, and as soon as said gas commences to escape from the digester undergoing filling, immediately closing said air vent and recovering said gas.

2,047,975—Paper and Process for the Manufacture of Same. Leo Liberthson, New York, N. Y., assignor to L. Sonneborn Sons, Inc., a corporation of Delaware. Application October 29, 1932. Serial No. 640,344. 2 Claims. (Cl. 91—68.) A wrapping paper impregnated with petrolatum containing dissolved therein an oil soluble copper compound, and adapted to substantially permanently prevent the spreading of fungi from a point of fungus propagation, said paper being substantially permanently water-repellent and containing at least 1 per cent of copper.

2,048,293—Manufacture of Absorbent Cloth-like Paper. George A. Richter and Milton O. Schur, Berlin, N. H., assignors to Brown Company, Berlin, N. H., a corporation of Maine. Application October 20, 1932. Serial No. 638,774. 9 Claims. (Cl. 92—40.) A process which comprises adding viscose to substantially ungelatinized papermaking stock at any stage of paper manufacture, including the bulk papermaking stock and the dried sheet of paper, and glycerinating the paper with glycerine of substantially 100 per cent strength. 9. A soft, porous, absorptive paper sheet made from substantially ungelatinized cellulose pulp and containing distributed substantially uniformly there through a small amount of regenerated cellulose and a distinctly larger amount of a cellulose-softening agent of the group consisting of glycerine, ethylene glycol, and glucose, the amount of cellulose-softening agent in said sheet being about 12 to 30 per cent, based on the dry weight of pulp, and the amount of regenerated cellulose in said sheet being so controlled that the absorbency of said sheet is not substantially less than that of a similar sheet made from only the substantially ungelatinized amount of regenerated cellulose imparting sufficient strength to said sheet substantially to offset the weakening effect thereupon when said cellulose-softening agent exists therein in the absence of said regenerated cellulose.

2,049,567—Manufacture of Paper Pulp. Louis Leonard Larson, Hockessin, and George Lewis Schwartz, Wilmington, Del., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. Application June 5, 1934. Serial No. 729,154. 5 Claims. (Cl. 92—9.) A process for manufacturing paper pulp from wood chips which comprises cooking wood chips in a pulping liquor of the class consisting of sulfite, soda, and kraft pulping liquor which contains a small amount of an agent selected from the class consisting of sulfonates of carbocyclic and alkyl substituted carbocyclic compounds containing less than 5 carbon atoms in the alkyl substituent, said agent being unaffected chemically with retention of its wetting properties during the heat treatment required for the conversion of the wood chips into paper pulp.

2,049,676 — Process of Treating Bleached Pulp. George H. Tomlinson, Montreal, Quebec, Canada. Application February 13, 1934. Serial No. 711,067. 10 Claims. (Cl. 8—2.) The process of improving bleached paper pulp which comprises acidulating the bleached pulp in aqueous suspension, washing and thereafter treating the pulp with a neutral solution containing free HOCl having no acidity greater than that of HOCl and in amount sufficient to obviate residual color solubilized by the acidulation.

2,049,759—Method and Apparatus for Packaging Rolls. John Edward Blosser, Glens Falls, and Paul Burke, South Glens Falls, N. Y., assignors to Veldown Company, Inc., a corporation of New York. Application May 8, 1935. Serial No. 20,328. 4 Claims. (Cl. 93—5.) Means to form the projecting ends of a wrapper about the ends of a roll of paper or the like positioned therein comprising a plurality of pivotally mounted folding hands, and means to rotate said hands in the same direction and normal to the axis of the roll toward a central position, said means comprising a plurality of sprockets and a single chain engaging and simultaneously rotating each of said sprockets in the same direction and to the same extent.

2,049,864—Paper Manufacture. Harold Robert Rafton, Andover, Mass., assignor to Raffold Process Corporation, a corporation of Massachusetts. Original application December 30, 1931. Serial No. 584,012. Divided and this application October 29, 1932. Serial No. 640,329. 20 Claims. (Cl. 92—21.) In a process of manufacturing paper wherein a paper mix containing fibrous material and alkaline filler is prepared and then run off on a web-forming device and wherein there is added size, the improvement which comprises adding size comprising saponifiable material and casein.

2,050,262 — Process of Manufacturing Paper and Paper Board. Levis Miller Booth, Plainfield, N. J. Application July 20, 1932. Serial No. 623,602. 12 Claims. (Cl. 92—21.) The method of making paper which consists of adding an alkaline substance which has a water solubility in excess of fifty (50) parts per million at such rate as to react with a portion of the water soluble substances in the vehicle water to the stock after the stock has been diluted to a consistency of less than two (2) parts of stock to ninety-eight (98) parts of water and subsequently forming paper.

2,050,315—Photoelectric Paper Cutting Control. Finn H. Gulliksen, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company, a corporation of Pennsylvania. Application February 1, 1932. Serial No. 590,267. 1 Claim. (Cl. 164—68.) In a tubing machine for making tubular sections of equal length from elongated sheets of paper previously printed with marks at definite places, power driven draw rolls to pull the web through said machine, a power driven rotary cutter for severing the web into equal sections, an individually adjustable, variable speed transmission to vary the set speed of said draw rolls with respect to the speed of said rotary means to compensate for slippage of said draw rolls with respect to said web, a pilot motor for changing the setting of said variable speed transmission, two circuits for controlling said motor, a rotatable switch alternately closing said circuits, a photo tube for controlling the amount of current flowing through said circuits and a source of light co-operating with said marks on said web for controlling said motor by said photo tube.

2,050,316 — Cutter Register Control. Finn H. Gulliksen, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania. Application March 16, 1934. Serial No. 715,874. 43 Claims. (Cl. 164—68.) A web controller comprising, in combination with web-advancing means and a device to be operative on the web at predetermined intervals longitudinally

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thereto, a radiation responsive detector affected in its operation by variations of speed of the web relative to the speed of operation of the device and also influenced by radiations coming from the web that are not materially influenced by speed variations of the web, a second radiation responsive detector influenced only by radiations coming from the web that are not materially influenced by speed variations of the web, and means including a motor operative in forward and reverse direction under the control of the detectors for increasing or decreasing the speed of the web relative to the speed of operation of the device, whereby the operations of the device on the web take place at predetermined intervals longitudinally of the web independent of variations in the appearance of the web.

2,050,350—Paper Feeding and Cutting Apparatus. Abe H. Markowitz, Los Angeles, Calif. Application October 8, 1934. Serial No. 747,352. 27 Claims. (Cl. 164—68.) In paper feeding and cutting apparatus, a drive-shaft, means for rotating said drive-shaft at a constant speed, a knife-head mounted on said drive-shaft, means to drive said knife-head from the drive-shaft admitting of limited independent motion of the knife-head in the rotary direction of the drive-shaft, a spring connected at its opposite ends to said drive-shaft and to the knife-head and tending to urge the knife-head in the same rotary direction as the drive-shaft, a brake engageable with said knife-head to retard the motion of the knife-head upon the drive-shaft and to increase the tension of said spring, and means to effect the application and release of said brake in each revolution of the knife-head to respectively retard and accelerate the motion of the knife-head with respect to the drive-shaft, said means consisting of a cam rotatable with the drive-shaft, and a roller contacting therewith operatively connected to said brake.

2,050,394—Paper Roll and Method of Forming Same. Louis A. Straubel, Green Bay, Wis. Original application November 14, 1934. Serial No. 752,971. Divided and this application October 18, 1935. Serial No. 45,621. 19 Claims. (Cl. 164—17.) The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transversely extending slits in the blank as there are rolls to be formed with adjacent rows having a common rectilinear boundary line, the spacing of said lines being greater than the length of the slits, the slits in each row terminating in one of the longitudinal lines, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

2,050,768 — Cutter for Paper Tubes. Lynn L. Seymour, Kansas City, Mo., assignor to The National Manufacturing Co., Kansas City, Mo., a corporation of Missouri. Application May 9, 1935. Serial No. 20,674. 6 Claims. (Cl. 30—3.) A cutter for cylindrical tubes, comprising a trough having an open top through which a tube may be inserted laterally, means for supporting said trough, a stop member at one end of said trough, clamping members mounted near said stop member, and a blade held immovably between said clamping members in a plane at right angles to the longitudinal axis of said trough, and projecting inwardly beyond the confines of the same, whereby an incision is made in said tube by the forced insertion thereof.

2,051,403 — Paper Coating. Sylvester Boyer and Le Clare F. Parmenter, Portland, Maine, assignors to S. D. Warren Company, Boston, Mass., a corporation of Massachusetts. Application July 16, 1930. Serial No. 468,260. 16 Claims. (Cl. 91—53.) In a paper coating machine, paper-strip moving means, means to apply fluid coating composition to the paper, a wiper mounted to press against the coated surface of the moving paper at a point in the travel thereof where the composition thereon is still fluid, said wiper furnished with a surface of major radius to which the paper approaches, and a curved surface of minor radius from which the paper departs, whereby a portion of the composition applied to the paper is wiped back and an immobile residue left adherent to the paper, and means for setting said adherent residue.

2,051,464—Method of Testing Coated Paper. Donald B. Bradner and William J. Montgomery, Hamilton, Ohio, assignors to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. Application January 28, 1928. Serial No. 250,252. 20 Claims. (Cl. 73—51.) The method of testing the coatings on coated paper comprising adhesively contacting to the coated paper a strip of adhesive tape, connecting the tape to a swinging body, allowing said body, after it has swung through a predetermined arc, to partially pull the tape from the paper and measuring the work done by the body.

2,055,142 — Paper Making Machinery. Joseph E. Bond, Middletown, Ohio. Application November 9, 1933, Serial No. 697,311. 11 Claims. Cl. 92—20). The method of breaking paper pulp of consistency as high as 10 per cent or more which comprises circulating the pulp in a tank, subjecting the pulp to a breaking and pumping action to break up the fiber bundles and return it upwardly to a height sufficient to circulate the stock in the tank, and flowing some of the stock that is pumped upwardly to fall on the moving stock to direct the floating pieces of pulp to cause them to pass into the breaking and pumping zone.

2,055,692 — Paper Making Machine. Richard T. Lang, Heidenheim-on-the-Brenz, Wurttemberg, Germany, assignor to American Voith Contact Co., Inc., New York, N. Y., a corporation of New York. Application December 22, 1933, Serial No. 703,532. In Germany December 24, 1932. 26 Claims. (Cl. 92—45). In a Fourdrinier paper and similar machine, a table roll section, a shake rail for the same, a shake device acting at any suitable part of the table rodd section, and means operating the shake device, said shake device being movably arranged alongside the shake rails.

2,055,785—Automatic Winding Take-Off. Cecil Richard Crowther, Pennside Hills, near Reading, Pa., assignor to Wyomissing Glazed Paper Company, West Reading, Pa., a corporation of Pennsylvania. Application October 3, 1934. Serial No. 746,683. 3 Claims. (Cl. 242—55). In combination with a machine for treating a roll of paper or the like, having a power drive for progressively feeding the paper, and a winding take-off roll for the fed paper means to maintain a regulated slack in the paper on its way to the take-up roll comprising, means for winding said take-up roll, means including a reciprocated control-arm adapted to engage and disengage said winding means, and a slack-suspended regulating roller movable into position to arrest recripocative movement of said control arm.

2,056,209—Paper Manufacture. Harold Robert Rafton, Andover, Mass., assignor to Raffold Process Corporation, a corporation of Massachusetts. No Drawing. Application October 29, 1932. Serial No. 640,330. 22 Claims. (Cl. 92—21). 1. In a process of manufacturing substantially unsized paper wherein a paper mix containing fibrous material and alkaline filler is prepared and then run off on a web-forming device, the step of adding saponifiable material in an amount insufficient to impart to said paper any substantial degree of resistance to the penetration of aqueous writing ink, more than 55% of the total amount of said saponifiable material being in unsaponified form.

2,056,562—Paper Machinery. Adam E. Bridge, Franklin, Ohio, assignor to The Black-Clawson Company, Hamilton, Ohio, a corporation of Ohio. Application March 10, 1934. Serial No. 714,963. 5 Claims. (Cl. 285—93). A condensate removal device for a hollow drier roll comprising a horizontally extending pipe portion, a rigid pipe extension depending from the end of said pipe portion, and a socketed hinge connection between said pipes, said connection comprising a member fixed on the end of the pipe portion and a member fixed on the end of the extension, said members having cooperating spherical seats in socketed engagement with one another affording lateral swinging and relative angular movement of one member with respect to the other about a point substantially corresponding to the spherical center of said seats, said members having cooperating means providing a fixed angle of inclination of said pipe extension with respect to the horizontally extending pipe portion.

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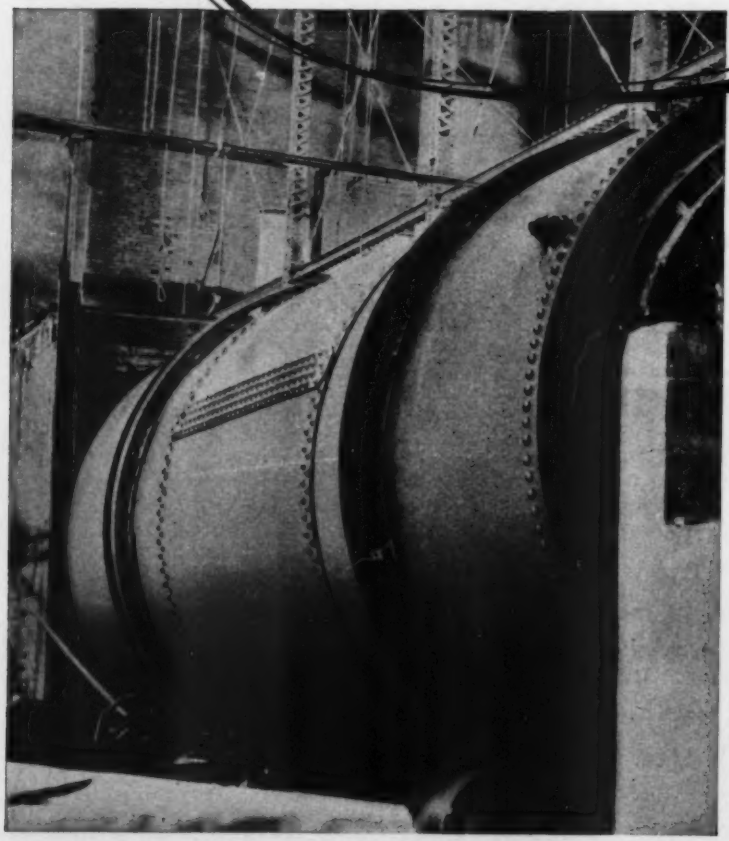

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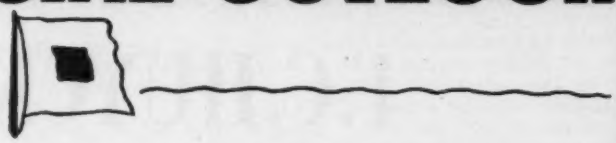

New York, December 1, 1936.

THE paper industry is booming along, in keeping with the other basic industries of the nation, developing broad activity and showing a sounder and more promising condition than has been noted in a lengthy while. Paper, board and other mills within the industry are busy, and many operating at full capacity, with a large majority producing at close to maximum output. The improvement in general business since the national election has been little short of surprising, and the paper industry has kept pace with the wholesome and appreciable upturn in nearly all lines of manufacture and trade.

All statistics indicate that the recovery reached a new high level during November. With the automotive industry speeding up productive operations, the steel industry resuming its upward trend after a brief letdown, carloadings mounting steadily, and all or most of the other basic barometers showing that business is forging ahead, the outlook now is that further increases in business will be registered as the customary brisk movement of merchandise at retail gets under way prior to the holiday season. Wholesale prices of commodities in the United States reached the highest level during the closing days of November for the past six years, reports the Bureau of Labor Statistics of the U. S. Department of Labor. Automobile production in the first ten months of 1936 was 12 per cent above the same period of 1935, and rural retail sales were 15 per cent higher, reflecting the general improvement in farm income and purchasing power, states the National Industrial Conference Board. Total building permits gained 66.5 per cent this year in ten months over 1935, and residential construction climbed 119.3 per cent, according to Government figures. Freight carloadings for this year have been unusual in the sharpness of the increase and its inclusive character; previously in the recovery period gains were confined largely to loadings of coal and coke, ore, forest products and miscellaneous products, all of which were at their smallest post-war volume in 1932, says the U. S. Department of Commerce.

Trade reports note a consistent and wide expansion in demand for paper and paper products. Obviously with business generally hitting the high spots again, more paper is needed and consumed, and paper manufacturers in some instances are being pressed to turn out sufficient tonnage to supply the market. One of the important developments within the industry during the last month has been the uptrend in prices of various classes of paper. Book paper has been advanced $5 to $7 a ton, fine papers have displayed a strengthening tendency, wrapping has moved firmer, and paperboard prices have stiffened. With the beginning of the new year, at least a slightly higher price basis goes into effect for newsprint, and some rather glowing predictions are being made for print paper during the course of the next twelvemonth. There is, in fact, considerable discussion in the trade regarding the probability of a severe shortage of newsprint eventuating in the not distant future, if the big rise in consumption keeps on.

Holiday business in writing paper this season will average 15 to 20 per cent greater in volume than for the Christmas season last year, sales agents for leading writing paper companies report. Manufacturers are running at capacity in an effort to keep up with shipping schedules, and notwithstanding the heavy production, it is stated that deliveries are now two to three weeks late.

With an increase of 4.3 per cent over the total for the previous month, newspaper advertising showed a gain slightly more than normal in October, according to the index of Printers' Ink. The index records a gain of 16.3 per cent over the level of October last year. Farm paper advertising showed an increase of 16.6 per cent over a year ago.

A new high record of newsprint production by Canadian mills was set in October, when for the first time more than 300,000 tons of print paper were produced in the Dominion. Although the production by United States mills is running far behind the record output of the 20's, the gain in Canada was sufficient to put the production for both countries in October up to a new record high, according to News Print Service Bureau figures.

Canadian mills produced 301,106 tons of newsprint in October, compared with 266,515 tons in the same 1935 month, and United States mills produced 81,027 tons, against 79,746 tons in October last year. Combined production of both countries was 382,133 tons, as contrasted to 346,261 tons in the similar month in 1935, and the previous record high for the month of 373,923 tons in October, 1929. The total production for the first ten months of 1936 for both countries was 3,365,247 tons, compared with 3,006,158 tons in the same 1935 period, and was only slightly under the record total of 3,404,339 tons in teh first ten months of 1929. Production for the first ten months of the year by Canadian mills was 2,604,831 tons, against 2,245,149 tons, and by United States mills 760,416 tons, against 761,009 tons.

Shipments of newsprint from United States and Canadian mills during October totaled 388,794 tons, with the result that stocks declined somewhat. At the end of October Canadian mill stocks were 59,574 tons and United States mill stocks were 16,424 tons, a total of 75,998 tons, contrasted with 82,596 tons a month before and 87,658 tons at the end of October, 1935.

Production of paperboard in the United States attained a new high level for the year in September, and with the single exception of October, 1935, was the largest in any month for the past three years. A total of 328,519 tons was produced in September, against 319,391 tons in the preceding month and 289,596 tons in September, 1935. The output in the first nine months of 1936 reached 2,647,373 tons, showing a big increase over the 2,410,575 tons produced in the corresponding period of 1935, and a larger gain over the 2,136,977 tons in the first nine months of 1934. New orders received by mills in September called for 353,197 tons of board, against 332,553 tons in the month before, and unfilled orders held by manufacturers at the close of September were for a total of 135,732 tons, compared with 117,443 tons a month previously.

Shipments of prepared roofing from mills in the United States are believed to have reached a new high record for all time in September, when a total of 4,284,205 squares of all types of roofing was shipped, comparing with 2,994,253 squares in August this year and 2,997,757 squares in September last year, according to Census Bureau figures. Shipments in the first nine months of 1936 aggregated 24,253,482 squares, against 19,903,105 squares in the similar 1935 period, and 18,449,243 squares in 1934.

◆ ◆

◆ New Wood Pulp Mill Planned in Australia

The projected plant of Associated Pulp and Paper Mills, Ltd., which is to be erected in Tasmania, is expected to be in commercial production by February, 1938. Its capacity will be 15,000 tons per annum of fine printings, writings, and typewriting paper. The pulp will be produced from Tasmanian hardwood. The plant will use a modified form of the soda process, and the paper will be produced from soda pulp.

◆ ON OCTOBER 31, 1936, the Titanium Pigment Company, Inc., was dissolved and effective November 2nd, 1936, a new selling organization known as Titanium Pigment Corporation, subsidiary of National Lead Company, was organized under the laws of the state of New Jersey, to act as sole sales agent for Titanox Pigments. The headquarters of the new corporation and the Eastern Sales Office will be located at 111 Broadway, New York City.

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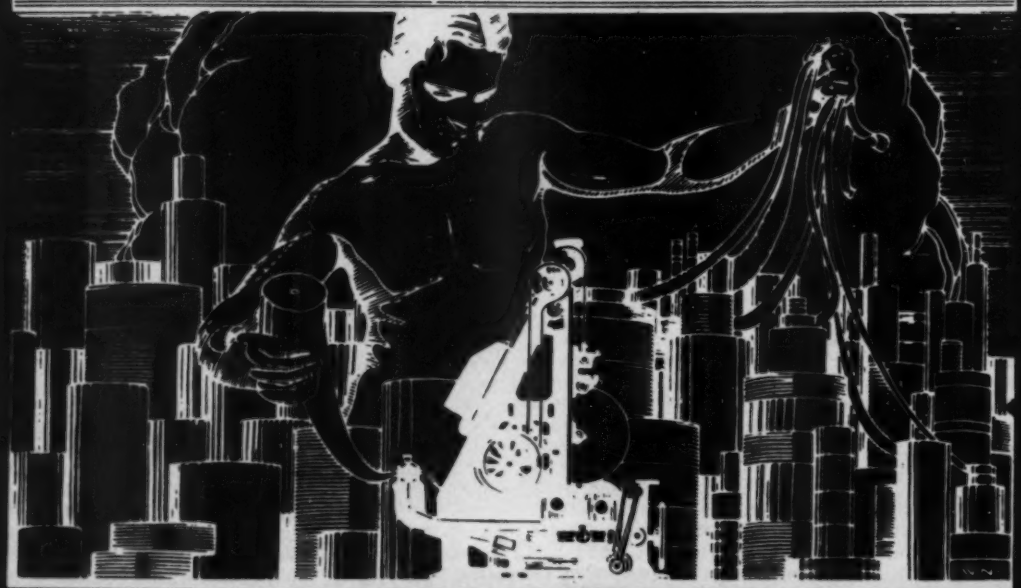

CAMERON MACHINE CO. BROOKLYN, N. Y.

Domestic RAW MATERIALS

◆ Papermaking Rags

Practically every class of raw material consumed in paper and board mills is in a strong market position; demand is active and the available supply is scarcely ample to fill the wants of buyers; the result obviously is that a firm price situation prevails. Changes over the last month have been in an upward direction, almost without exception, and some materials appear likely to rise to higher levels.

Rags for papermaking seem in as strong a position as any other form of raw stock for paper manufacture. There is no actual shortage of rags; that is, generally speaking, although certain grades may be out of the market for the time being, but the call from consuming quarters is just about equaling the available supply with dealers and importers complaining of the difficulty in replacing the stocks sold, and buyers are finding it necessary to pay firm prices to secure the rags desired. All up the line, from the lowest grade of roofing rags to the highest qualities of new cotton and linen cuttings, prices exhibit pronounced strength, and predictions within the trade are that higher market levels will be seen.

An important factor is that European dealers are not a bit eager about selling rags to the United States, except at prices which in a great majority of cases are above market values ruling here. Reports say sellers in Europe are provided with a ready market at home or in neighboring countries for all the rags they have to offer, and most often at prices netting them better returns than when sales are made for export to America. Germany, Italy, Poland and other European nations are utilizing rags on a large scale at present, and are absorbing required supplies from nearby countries, with the result there is nothing like the customary amounts of rag stock available for shipment to the United States. This is a circumstance, so importers here assert, which is likely to lead to sharply higher rag prices should consumption by American paper and felt mills show a further increase.

New No. 1 white shirt cuttings have been reported sold to fine paper manufacturers at higher than 8 cents per pound f.o.b shipping points; it is said, in fact, that extra desirable packing of these rags has brought as much as 8.50 cents at dealers' points of shipment or close to a 9 cent delivered mill basis. Packers in common now ask 8.25 cents or higher f.o.b. their points for white shirt cuttings, especially when guaranteed free of stock treated with acetate. New soft unbleached muslins are quoted by dealers at 8.50 to 8.75 cents a pound at shipping points, new blue overall cuttings at 7 to 7.25 cents, light silesias at 6.25 cents, light flannelettes at 7 cents, new canvas cuttings at 8.25 cents, bleached canton flannels at 8 cents, black silesias at 4.25 to 4.50 cents, fancy shirt cuttings at 3 to 3.25 cents, and No. 1 washables at 2.75 cents. New white linen cuttings are about 11 cents per pound, and grey linen 10 cents.

Roofing rags are selling in the East at 2 cents a pound or very close to this level for No. 1 domestic packing, and 1.65 cents for No. 2 roofing or mixed satinets f.o.b. shipping points. Offerings at these prices are none too free, as dealers anticipate further market advancement. About the highest reported paid for foreign dark colored cottons is 1.90 cents ex dock American Atlantic ports, but importers say they are now being asked 2 cents in most cases by shippers abroad, and frequently higher, and that they would have to get above 2 cents from roofing paper mills to import rags at a profit for themselves. Domestic old white cottons are in fair demand and selling at 3.75 cents or more per pound at dealers' points for No. 1 repacked whites, whereas thirds and blues are in restricted call and quoted at 2 cents upwards, with twos and blues about 2.25 cents for repacked.

◆ Old Paper

Old paper is in excellent demand and firm quotably. Board manufacturers have bought on a large scale, and it is no secret that even though they have absorbed practically all the tonnage offered, they have used up stock in some instances in excess of incoming supplies, with the result their inventories have been reduced. Firm prices have been granted on levels higher than have been known in waste paper in a lengthy while. Moreover, all grades have moved freely, even old books and magazines which for a time were relatively quiet having spurted in market activity.

No. 1 mixed paper is selling in the East at 45 cents per hundred pounds f.o.b. shipping points, and folded news at 57½ and 60 cents. Prevailing prices in the Middle West are 45 cents for mixed and 50 cents for news. Heavy book stock is up to 80 cents per hundred pounds in the East at points of shipment, crumpled books 70 cents, white ledgers 1.15 to 1.25 cents a pound, colored ledgers 85 to 90 cents a hundred, old No. 1 kraft 1.15 to 1.25 cents per pound, white blank news cuttings 1.25 to 1.30 cents, No. 1 hard white shavings 2.15 to 2.40 cents, according to quality; No. 1 soft white shavings 2 to 2.40 cents, and No. 1 hard white envelope cuttings 2.55 to 2.65 cents.

◆ Rope and Bagging

Old bagging is gradually climbing in price as demand grows. Paper mills are not buying so actively but other consumers—notably shredders for the automotive industry—are absorbing supplies in a large way and running prices upward. No. 1 scrap bagging is 1.90 to 2 cents a pound f.o.b. shipping points, gunny bagging 2.10 to 2.15 cents or higher, and roofing bagging 1.50 to 1.60 cents. A steady demand is noted for old rope and prices are maintained on a level of 2.75 cents or more per pound at shipping points for No. 1 domestic manila and above this for foreign old rope.

◆ Pulpwood

Pulpwood is in steady demand, both against contracts and from spot buyers. A firm tone marks quotations. Imports of pulpwood into the United States during the first eight months of the current year totaled 789,009 cords of a declared value of $6,187,693, against 683,838 cords of a value of $5,083,419 in the same 1935 period.

◆ Mechanical Pulp

Offerings of mechanical pulp are slim. Domestic producers are well sold up, and in a majority of cases have little tonnage to divert to the open market, either needing all the pulp they are manufacturing for their own purposes or against contract sales. Indications are a good deal more business could be readily consummated were the necessary supplies available in the market. Prices are firm and are supported by strong quotations named from abroad on groundwood. Domestic prime groundwood is selling at about $29 a ton delivered consuming mills, depending on the haul from pulp mills. Canadian groundwood is $23.50 or higher per ton ex dock New York or other American Atlantic ports for moist pulp brought down by schooners, while Scandinavian groundwood has advanced to a quotable level of $27 to $28 per short ton for dry and around $25.50 for moist ex dock Atlantic seaboard.

◆ Chemical Pulp

A development of importance in the domestic chemical pulp market is an advance of $2 a ton in the quotational basis on bleached soda pulp to 2.70 cents a pound delivered book paper mills. Sulphite is firm and actively sought. Domestic manufacturers are expected to ask 2.75 cents upwards for prime bleached sulphite for the first quarter of 1937, ex dock American Atlantic seaboard, or a rise of at least $2 a ton above the present market level. Unbleached sulphite is nominally 2.15 to 2.25 cents a pound for book grades and 2 to 2.10 cents for news grade, and domestic kraft pulp is nominally 2.10 to 2.25 cents f.o.b. producing points.

◆ Chemicals

Advances appear certain for papermaking chemicals on 1937 contracts. Bleaching powder is firm at 2 to 2.25 cents a pound in drums f.o.b. works. Casein is 17 to 17.50 cents for domestic, and 17 to 18 cents for imported. Special papermaking starch is 4 cents a pound in bags at works.

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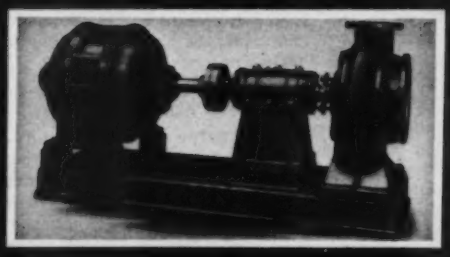

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

It is not stretching the point to state that a virtual famine of chemical wood pulp exists, that is for delivery for some time to come. Producers abroad, and in the United States as well, are sold out for next year; at any rate, they have sold all the pulp that either they have to sell or care to dispose of as yet, and in spite of the heavy transactions in pulp over recent months, there are plenty of indications that numerous paper and board manufacturers haven't their anticipated 1937 requirements provided for, and that they are exceedingly eager to secure more pulp to augment their forward supplies.

Members of the pulp trade say they could readily effect sales running into thousands of tons of pulp for delivery over the next twelve to eighteen months if the necessary supply were to be had. Inquiries are constantly coming in from consuming quarters for sizable lots of pulp of various classes, and pulp importers and agents are simply frustrated in their efforts to fill these wants of their mill customers because of being unable to get the pulp desired. Prices are doing more than climbing; the market is assuming something of a runaway as regards the rapid ascent of quotational levels. How much farther the price advance can or will carry is purely problematical at present.

The truth of the situation apparently is world consumption of pulp has made such broad strides forward during the current calendar year that the present use of the commodity together with the active buying to cover future needs has created demand of a scope far in excess of the available supply of pulp. Not only has consumption in the United States increased tremendously, but a great deal more wood pulp is being purchased and used in practically all pulp-consuming countries. Paper and board mills the world over are operating much more actively and are consuming raw material in greatly increased tonnage. A big expansion of demand for pulp for rayon manufacture is an important factor adding breadth to the world's pulp requirements.

Market prices have advanced to where 3.25 cents a pound ex dock American Atlantic seaboard is about the low quotable basis on any prime bleached sulphite of foreign origin for delivery for some months to come. Prime strong unbleached sulphite is quoted at 2.25 to 2.35 cents ex dock New York or other U. S. Atlantic ports, and prime Swedish or Finnish kraft pulp at 2.40 to 2.50 cents a pound. It is possible that purchases for 1938, or more than a full year hence, could be accomplished at below these prices, provided guarantees of exchange, etc., are given by buyers, but shipments at any time during 1937 are now generally priced at the foregoing bases, and few producers are said to be willing to sell for 1938 as yet.

Instances are cited where spot or nearby prime kraft pulp has been sold at 2.50 cents, or higher. The nominal quotation on 1938 kraft is 2.10 to 2.25 cents, but purchases this far ahead are extremely difficult to effect. Bids of 3.15 cents have lately been cabled on prime bleached sulphite for next year's shipment from abroad, and sellers have come back asking 3.25 cents and refusing to accept less. Foreign groundwood is quoted at $27 to $28 per short ton for dry and $25.50 to $26 for moist for shipment from abroad ex dock American Atlantic seaboard.

Imports of wood pulp into the United States during September were below the receipts in the preceding month but well above the arrivals in the same month a year ago. A total of 186,558 short tons of 2,000 pounds, air dry weight, of chemical pulp was imported in September, valued at $6,989,193, according to U. S. Commerce Department figures, comparing with 198,511 short tons of a value of $7,384,204 in August this year and 148,114 short tons of a value of $5,748,988 in September last year.

The September imports brought the total for the first nine months of the current year up to the million and a half ton mark, or 1,500,715 short tons, representing a sharp increase over the total of 1,146,270 tons imported in the corresponding period of 1935. Groundwood imports in September amounted to 25,163 short tons, valued at $432,094, and making a total for nine months this year of 159,085 tons, as contrasted to 116,082 tons in the same time last year.

◆ Paper Stock

The United States imported 22,959,133 pounds of rags for papermaking of a declared value of $452,665 in September last, bringing the total in nine months of the current year up to 224,202,440 pounds of a value of $3,616,592, against 132,314,159 pounds of a value of $1,591,286 in the similar nine months of 1935. This is an increase of 69 per cent this year. Imports of other papermaking stock, comprising old rope, scrap bagging, waste paper, etc., were 5,098,498 pounds of a value of $101,010 in September, making an aggregate of 77,775,116 pounds of a value of $1,323,995 for nine months this year, against 55,121,010 pounds of a declared value of $787,185 a year ago in the same time.

◆ Paper

Paper and paper products imports into the United States ran fairly heavy in September, amounting to a total value of $9,764,236, according to U. S. Department of Commerce statistics, comparing with arrivals of a value of $7,670,204 in the same 1935 month. Imports during the first nine months of 1936 reached a value of $78,847,937, compared with $65,951,530 in the similar period of 1935.

Standard newsprint to the value of $68,780,272 was imported in the first nine months of the current year, against $57,993,067 a year ago. Cigarette paper to the value of $2,983,276 was imported this year in nine months, compared with $2,447,304 last year, while kraft wrapping paper to the value of $1,154,533 was included in this year's imports, against $436,391 in nine months of 1935.

EXPORTS

Exportations of paper and paper products from the United States are consistently rising, registering a fair increase over a year ago. During the month of September exports reached a value of $1,779,784, against $1,586,171 in the same 1935 month. Exports during the first nine months of the current year were valued at $16,750,383, comparing with shipments having a total value of $15,008,098 in the same period last year.

The largest item of export, in point of value, in nine months this year was writing paper, shipments of which out of the country were valued at $1,555,360, as contrasted to $1,252,770 in the corresponding 1935 period. Exports of wrapping paper other than kraft were valued at $1,503,348, against $1,355,210 in nine months last year, while kraft wrapping exports were valued at $215,882 this year. Exports of greaseproof and waterproof paper reached a value of $1,165,990 in the first nine months of 1936, against $883,529 last year; of fiber insulating board, $1,029,606, against $947,955; of box board, $929,705, against $899,782, and of other paperboard, $780,731, against $741,931; of uncoated book paper, $655,365, against $733,862; of newsprint paper, $486,854, against $633,713; of paper bags, $557,963, against $551,536.

Exports of paper base stocks from the United States in the first nine months of 1936 amounted in value to $9,341,669, comparing with $7,146,868 in the same 1935 period. Sulphite wood pulp comprised the bulk of these shipments.

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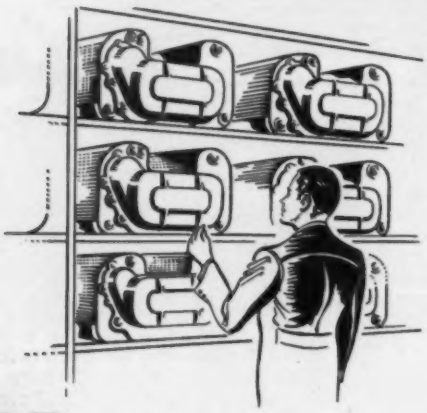

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